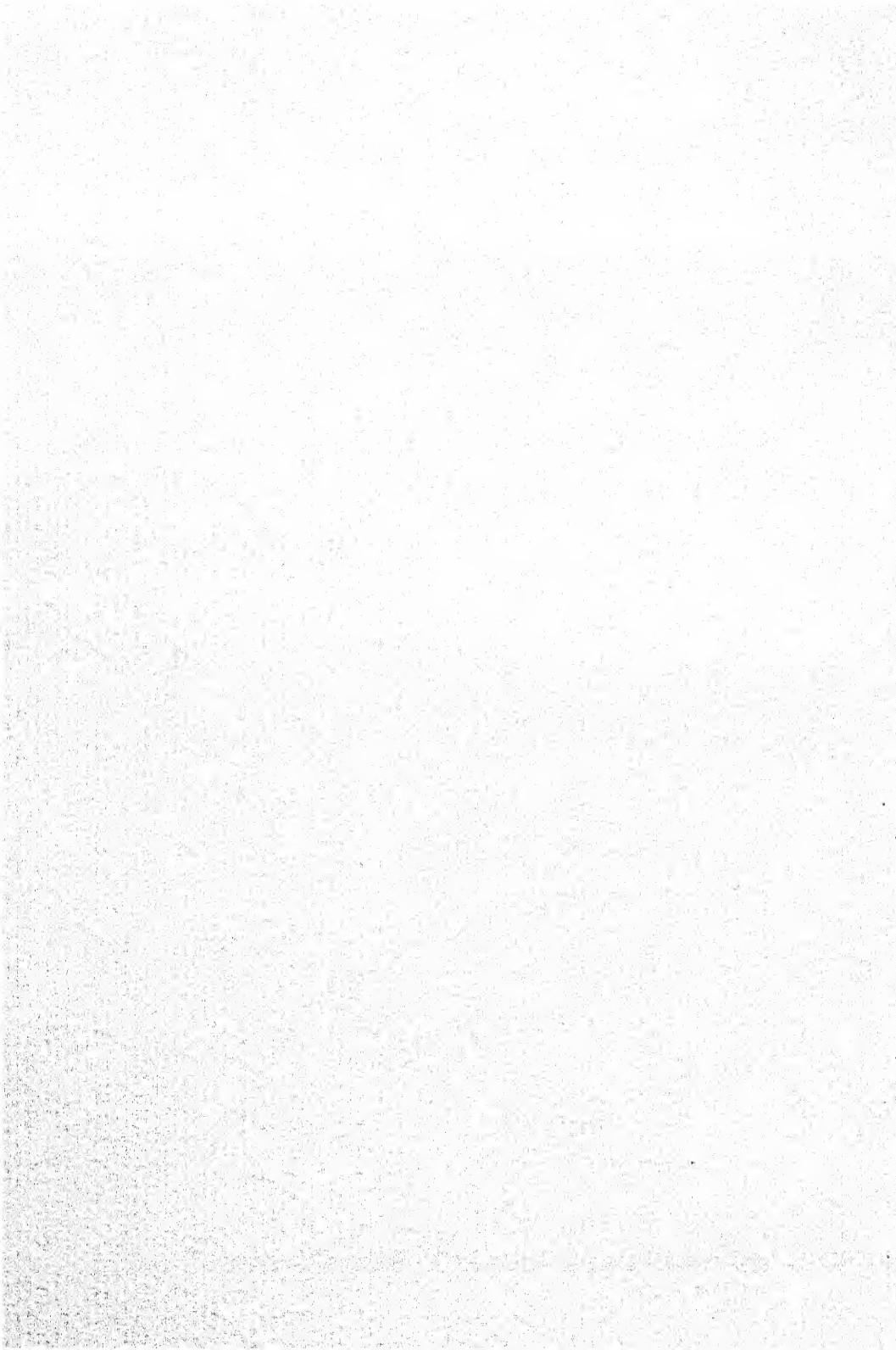


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TABULAR KEYS
FOR THE
IDENTIFICATION
OF THE
WOODY PLANTS





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TABULAR KEYS

FOR THE

IDENTIFICATION OF THE WOODY PLANTS

Compiled and arranged by

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P R E F A C E

This set of TABULAR KEYS has been evolved for the use of students and others interested in the more used woody plants of the Northern States and Canada—for study and for identification in the field.

It cannot take the place of those more detailed and complete references already available nor is it so intended. It is rather designed for quick reference and comparison and for use in the field. The attempt has been made to eliminate as far as possible the use of instruments such as scalpel and microscope and to lead the student to observe and to identify from external characters.

The Keys include the five hundred trees, shrubs, vines, conifers, and broad-leaved evergreens heretofore described in the card file entitled "USEFUL TREES AND SHRUBS." These Keys supplement and complete that work. But the two can be used separately if desired. Every attempt has been made to verify the characters used and to check them against the work of standard authors. With a few exceptions, the nomenclature follows that of the last edition of the Manual by Alfred Rehder. In the interest of simplicity we have retained one or two names which much usage has seemed to justify and we have preferred to follow recent precedent in discarding the capitalization of species names and the double i ending. Changes from the card file can be noted in the list of names preceding the text.

In offering this set we trust it will prove helpful to students and useful to others.

FLORENCE BELL ROBINSON



How To Use the Keys

Keys to the *genera* are similar in type to the keys found in all standard works on Botany, but differ from the other keys in the attempt to eliminate the use of scalpel and microscope, also in the addition of a key based on winter buds and twigs. These genera keys are adapted from those arranged by Dr. Trelease and published in "The Native and Naturalized Trees of Illinois." We are indebted to Dr. Trelease and Dr. Tehon for their permission to do this. Data incorporated in the keys has been checked against the works of the following authorities—Gray, Rehder, Bailey, Trelease, as well as in the field. In only a very few instances have we taken the liberty to disagree with any of these authorities.

In using the keys, read all statements labelled A, AA, AAA and decide which one best fits the tree or shrub you are considering. If it belongs under A, then you have eliminated all under AA and AAA and need consider those no further. Similarly for AA or for AAA.

Below A is b and the latter is used twice, i. e. b and bb. Again decide which of the two fits the tree or shrub and then proceed to the next pair of statements, labelled c and cc. Continue this until the last statement leads to the name of a genus. For every positive statement there is a negative—a tree *is* or *is not* of a certain type, it *has* or *has not* a certain character. With that fixed in mind the keys are simple to use and the results you obtain depend only upon the accuracy of your observation and judgment.

Having traced the plant to the name of a genus, turn to the page and genus indicated and check the twig or leaf against the identification characters there stated for winter and for summer. If it fails to check at this point you have made an error and will need to begin over. But if you have been accurate, it will check. It sometimes occurs that one is not certain of some character to be observed, in which case it is necessary to proceed by the process of elimination. Assume the first statement and carry through. If it does not check at the end, go back and try the opposed statement and proceed until you get a positive check.

Continue the identification by means of the *tabular keys to the species*. Begin at column one—again you find a positive and a negative statement, both in column one. If the first statement fits, do not go below the line of the second. If the second statement fits better than the first, then skip everything above that statement. The full identification depends upon a combination of characters, as is clearly shown in this tabular key, and not upon any one characteristic alone. Follow each column through in turn, and decide upon the character that fits in each case. Having decided upon a character, you do not need to consider anything above that line in successive columns. When you have finished, the species of your leaf or twig will check horizontally across the page. The heavy dotted lines assist in tracing down the decisive differences between species. These are drawn solely for the purpose of clarity and have no other significance.

The heavy full lines and doubled lines assist in reading the keys rapidly. Heavy lines divide the species into smaller groups having similar characteristics, and the dotted lines call attention to certain important points of distinction between adjacent species.

Keys for trees, shrubs, vines, conifers, and broad-leaved evergreens are separated. Since each type of plant is thus considered separately it is necessary to decide first of all to which type the plant belongs. If not sure of this, the process of elimination can be used, trying each type in turn until you get a positive check on characteristics.

KEY TO THE TREES WHEN IN LEAF

- A. Leaves persistent, simple, entire, resinous-dotted Myrica
- A. Leaves deciduous in autumn; with a broad blade, not needle-like
- a. alternate (one leaf at a node)
- fruit a cone; buds solitary, stalked, with 3 scales which meet at the edges Alnus
- fruit not a cone; buds not as above
- b. leaves simple
- leaves parallel-veined, appearing fan-like Ginkgo
- leaves with a midrib, net-veined
- leaves clothed with silvery or brownish scales . . . Elaeagnus
- leaves without scales
- c. margin entire, neither toothed nor lobed
- sap milky, twigs spiny Maclura
- sap not milky, twigs not spiny
- leaf broad as long, heart-shaped Cercis
- leaf longer than broad
- with a narrow scar completely encircling the twig at nodes . Magnolia
- without such scar
- leaf widest above middle and with veins anastomosing Asimina
- leaf widest at or below middle or occasionally above middle but with veins not anastomosing, scarcely visible; leaf leathery.
- Underside finely hairy Quercus
- Not hairy below
- twigs very slender Celtis
- twigs moderately stout
- pith with diaphragms; leaf obovate, leathery, veins scarcely visible Nyssa
- pith without diaphragms; leaf oblong Diospyros
- cc. leaf margin toothed
- d. with several strong veins from the base.
- e. about as broad as long
- lobed Kalopanax
- not lobed Tilia
- ee. longer than broad Celtis
- dd. with only one strong vein from the base
- twigs rather spiny
- leaves folded in the bud; fruit apple-like Malus
- leaves rolled in bud; fruit pearlike; with many short spurlike branches Pyrus
- armed with long, sharp thorns; buds stout, red, with fleshy scales . . . Crataegus
- not spiny nor armed with thorns
- e. margin singly toothed
- f. teeth coarse, or if small then widely spaced.
- leaf base oblique Ulmus
- leaf base not oblique
- leaf about broad as long . Populus
- longer than broad
- teeth few or margin entire
- Nyssa
- teeth many
- buds long, cigar-shaped. Fagus
- buds short
- leaves obovate, veins curved, teeth longish
- Quercus .

- leaves widest at middle;
 veins quite straight, side
 veins parallel, teeth short,
 one at end of each vein . . Castanea
- ff. teeth fine
 petiole with small glands Prunus
 petiole without glands
 leaves linear or lanceolate . . . Salix
 leaves broader, ovate-lanceolate to ovate.
 bark not scaly, looks muscular. Carpinus
 bark scaly, leaf-base symmetrical
- g. with stipules
 stipules persisting, pet-
 ioles short. . . . Photinia
 stipules deciduous, peti-
 oles longer, slender. Amelanchier
- gg. without stipules, leaves thin,
 bark shredding . . . Halesia
- ee. margin doubly toothed
 base oblique Ulmus
 base symmetrical
 bark scaly, peeling in long strips . . Ostrya
 bark not scaly.
 bark in layers, often papery . . . Betula
 bark not in layers, muscular . . . Carpinus
- ccc. leaf lobed
 h. with several strong veins from the base
 sap milky Morus
 sap not milky; leaves broad as long
 leaves notched at tip Liriodendron
 leaves palmate, maple-like
 with a narrow scar around each node; base
 of petiole enlarged over the bud. Platanus
 without such scar, buds unconcealed . . Liquidambar
- hh. with only one strong vein from the base; vari-
 ously lobed
 mucilaginous and aromatic; margin entire. . Sassafras
 not so; margin toothed
 pith star-shaped in section; buds with thin
 overlapping scales . . . Quercus
 pith round; twigs with long, sharp spines; buds
 very short, red, with hard, thick scales
- Crataegus
- bb. leaves compound
 i. singly odd-pinnate
 j. with stipules
 margin serrate
 leaflets often lobed; hairy, velvety Koelreuteria
 not lobed, not hairy Sorbus
 margin entire
 armed
 with paired spines at base of leaves Robinia
 with large simple or branched spines on the stem. Gleditsia
 unarmed
 leaflets usually alternate, elliptic to ovate, short
 acuminate; petiole swelled to cover the bud;
 branchlets brown Cladrastis
 leaflets oblong-elliptic, smaller, opposite, acute;
 branchlets green; buds not concealed . . Sophora
- jj. without stipules, unarmed
 j'. margin serrate
 with glands at base of leaflets; twigs yellowish,
 velvety Ailanthus
 without glands, pith star-shaped in section
 pith solid; leaves hard, lustrous, or nearly
 tomentose, and glandular when young . Hicoria

KEY TO THE TREES IN WINTER

a. leaf scars whorled or opposite
 scars notched at the top; buds superposed; fruit an ovoid capsule . . .
 Paulownia

scars not notched; buds not superposed; fruit a very long, terete pod
 Catalpa

aa. leaf scars opposite
 b. twigs swollen at nodes; buds often developing short spurs. Cercidiphyllum
 bb. twigs not swollen at nodes
 twigs covered with silvery or brown scales (appearing in very young
 growth like the fuzz of a peach); bark fibrous,
 interwoven Elaeagnus

twigs not covered with scales
 end-bud lacking, twigs forking, bark cherry-like . . . Syringa
 (see shrubs)

end-bud or its scar present
 end-bud very large ($\frac{1}{2}$ " or more); twigs thick. . . Aesculus
 end-bud moderate or small ($\frac{1}{4}$ " or less)
 c. leaf-scars meeting around the twig
 scars small, often on raised bases, crescent-shaped;
 joined by a concave line; bud-scales
 nearly or quite valvate Cornus

- scars V-shaped, meeting in a convex line, an inverted V or ragged line; bud scales imbricate Acer
- cc. leaf scars not meeting around the twigs; buds sessile
leaf scars shield-shaped; buds with 2-4 scales; bundle traces numerous in an ellipse. Fraxinus
- leaf scars horseshoe shaped, almost meeting around the bud; buds compressed from the sides and silky-brown hairy Phellodendron
- aaa. leaf scars alternate (only one at a node)
- d. fruit a cone; ordinary leaf scars present; buds moderately large, solitary, stalked, with 3 scales which meet at the edges . . Ailanthus
- dd. fruit not a cone; buds not as above
e. buds hemispherical, with many scars clustered about them, developing into short spurs Ginkgo
- ee. not thus
f. leaf scars very large
g. twigs thick, end-bud lacking
twigs yellowish, velvety; buds solitary, smallish, hairy, located close to scar Ailanthus
twigs glabrous, glossy, whitened as though with paint; buds minute, superposed, in tiny silky craters removed from the scar Gymnocladus
- gg. twigs moderately thick, end-bud present
buds superposed, hairy, fairly large; pith with cavities; fruit a nut; twigs more or less fluted; bundle traces in 3 groups . . . Juglans
buds solitary; twigs terete; bundle-traces 5; fruit a capsule Cedrela
- ff. leaf scars moderate or small
h. twigs green
mucilaginous and aromatic; buds small, glabrescent, subglobose with fleshy scales . . . Sassafras
not mucilaginous nor aromatic nor with fleshy scales.
- i. buds silvery, silky-hairy
stipules persistent; twigs slender . . Laburnum
stipules not persistent, their scars left; twigs moderate, encircled by a line at the nodes . . . Magnolia
- ii. buds not silvery, silky-hairy, but woolly, superposed, at first covered by the leaf scar; sometimes thorny Sophora
- hh. twigs not green
j. with a narrow scar encircling the twig at the nodes
buds long, slender, pointed (cigar-shaped) . . Fagus
buds not long and pointed
terminal buds flattened like a thumbless mitten over the twig-tip, with two valvate scales Liriodendron
terminal buds not flattened, with 1 scale only
buds hairy; leaf scar U-shaped . . Magnolia
buds not hairy, leaf scar scalloped, encircling the bud Platanus
- JJ. scars not or rarely meeting around the twig.
k. with spines or thorns
twigs with silvery or brown scales . . Elaeagnus
twigs not scaly
l. with thorns or prickles between the nodes
prickles short, numerous . . . Kalopanax
thorns long, large, often branched;
nodes swollen, reddish, looking like an angry sore . . . Gleditsia
- ll. thorns or prickles at the nodes only
thorns stipular, paired . . . Robinia
thorns not stipular
thorns small, slender, beside the

bud (lateral); buds with thin scales; sap milky . . . *Maclura*
 spines long, stiff, sharp, axillary, becoming twigs; buds with firm, hard, fleshy scales, usually red; sap not milky *Crataegus*
 kk. without spines or thorns
 twigs resinous-dotted *Myrica*
 twigs not resinous-dotted
 end-bud naked; buds silky-brown
 hairy *Asimina*
 end-bud with scales, or lacking
 m. lowest bud scale centered over
 the leaf scar
 bud with only 1 scale . . . *Salix*
 bud with several scales . . *Populus*
 mm. lowest scales at side of bud
 bark silvery; twigs with corky ridges; pith star-shaped . .
 Liquidambar
 not thus
 n. buds superposed
 pith solid, crossed by diaphragms . . . *Nyssa*
 pith not solid or not crossed by diaphragms
 leaf scar C-shaped, almost encircling the buds; buds brown-silky in aggregates resembling single buds . . . *Cladrastis*
 leaf scar more narrow; bark of twigs scurfy, rubbing off in fine, hairlike threads; buds with 4 fleshy red scales . . . *Halesia*
 bark not scurfy
 buds rather large; scars with numerous bundle traces in 3-4 groups; pith solid . . . *Hicoria*
 buds smaller; bundle traces 3
 twigs almost black or with a reddish cast; scars fringed at the top; flower buds between the nodes . . . *Cercis*
 twigs lighter; pith solid and crossed by diaphragms . *Nyssa*
 nn. buds solitary
 buds $\frac{1}{2}$ -ellipsoid, directed almost at right angles to the twig and with 2 exposed scales . . *Koelreuteria*
 buds not as above, spreading
 o. buds red, or green tinged red.
 buds long, slender, with twisted scales . . .
 Amelanchier
 buds short, stout, with

fleshy scales *Tilia*
oo. buds not or very slightly red
p. bud scales keeled
 scales mucronate; twigs slender,
 not spinescent . . . *Photinia*
 scales not mucronate; twigs moderate,
 spinescent . . .
 scales pubescent and margined . *Malus*
 scales glabrous, not margined . *Pyrus*
pp. bud scales not keeled nor mucronate
q. buds in two rows (2-ranked)
 without stipule scars; buds a
 little flattened . . . *Diospyros*
 with stipule scars
 with 2 or 3 scales; bud not
 flattened; pith 3-sided,
 continuous, green . . . *Betula*
with more than 3 scales
r. bud scales in 2 rows,
 bark scaly
 scales not striate . . . *Ulmus*
 scales striate . . . *Ostrya*
rr. bud scales in 4 rows; bark
 muscular *Carpinus*
qq. buds not in 2 rows
s. twigs more or less fluted,
 moderate
 end-bud solitary or lacking;
 bundle traces 3 . *Castanea*
 end-bud multiple; bundle
 traces numerous, more
 than 3 *Quercus*
ss. twigs rounded
 buds elongated, end-bud
 rather large and covered
 with long, white hairs
 emerging from inner
 scales *Sorbus*
 buds all smaller; often
 collaterally multiple
 buds fat, sap milky . *Morus*
 buds slender, sap not milky
 twigs with a bitter
 almond flavor . . *Prunus*
 twigs not flavored
 buds very small, closely
 appressed; bark
 with corky warts
 or ridges *Celtis*

The Genus ACER is distinguished in
 SUMMER : by the opposite arrangement with the leaf scars meeting in a point; the leaves thin, generally lobed, palmately veined; the fruit a paired samara.
 WINTER : by the opposite arrangement, with the leaf scars meeting in a point and ciliate at the top; twigs rather slender; buds sessile, of moderate size, with imbricate scales.

Species	leaves	leaf form	lobe tips	leaf edge	under side of leaves	flowers	veination	sap	sinus	leaf shape
negundo	compound	lobed		doubly serrate						
tataricum	—	—	not lobed							
campestre	"	3-lobed	obtuse — —	entire — —	pubescent	light green	corymbs			milky
spicatum	"	"	taper-pointed	doubly serrate	white downy	erect	panicles			
ginnala	"	"	" central lobe long.	"	glabrous	pendulous	panicles			
pennsylvanicum	"	"	pointed	sessil	brownish-green	racemes				
pseudoplatanus	"	5-lobed	acute	fully serrate	lous first pendulous	racemes				
saccharinum*	"	"	acute or acuminate	deeply serrate	pendulous	impressed	not milky	not	deep oval	
rubrum	"	"	acute or acuminate	crenate-serrate	lateral	not impressed	milk	road	road angle	
palmatum	"	deeply 5-7 lobed	acute	full double serrate	white glaucous	pendulous	impressed	milk	not	
platanoïdes	"	"	finely pointed	coarsely dentate	lustrous leafy	corymbs	bearded	milky	—	broader than long
saccharum	"	"	3-pointed	few coarse serrate	glabrous	pendulous	" in axils	not	—	longer than broad
nigrum	"	"	central point	few coarse teeth	pale	corymbs	"	milk	"	
circinatum	"	7 or more acute lobes	with blunted shoulders	few coarse teeth	soft-pubescent					
palmatum	"	"	acute	irregularly doubly serrate	becoming glabrous	corymbs, petals white	all parts glabrous	"	shallow	
japonicum	"	"	"	"	glabrous	purple corymbs	"	"	deep-cut	
					glabrous	purple corymbs except on veins	pubescent	"	"	

The Genus ACER is distinguished in

WINTER : by the opposite arrangement with the leaf scars meeting in a point and ciliate at the top; twigs rather slender; buds sessile, of moderate size, with imbricate scales.

species	bud scales	no. scales exposed	buds	twig color	texture	leaf scars	twigs	bark
spicatum	valvate	one pair	slender, short	gray	puberulent			
pennsylvanicum	"	"	large, stout	green	glabrous			
palmatum	"	two	short, no end-bud	brown	glabrous	low and narrow	slender,	never bloomy green striped white
japonicum	valvate	more than two	"	green	"	broad, top winged	slender,	
circinatum	valvate	one pair	"	purple	"	broad, not winged	slabrous	
negundo	"	two	end-bud; short, fat, multiple, fascicled	glaucous, green or red	hairy	minute red glands above	slender,	"
rubrum	imbricate	four	"	scarlet to crimson	glabrous	meet in a point	crimson	glabrous, bloomy
saccharinum*	"	4-6	"	red-brown	"	"	slender	firm
platanoides	"	"	"	"	"	"	slender	flaking
nigrum	"	more than six	large, flushed red	dull red	pubescent	"	slender, dull	lenticellate, gray-brown
saccharum	"	"	moderate, acute	straw-color dark buff	glabrous	"	slender, dull	dark gray
pseudoplatanus	"	six	"	"	"	"	slender, polished	medium gray
campestre	"	6-8	large acute, bright green	brown	"	"	moderate, glabrous	moderate, gray
ginnala	"	"	short, ovoid	short, blunt, gray	woolly	"	moderate, pubescent	slightly corky
tataricum	"	"	very small, blunt, ovoid	red-brown	glabrous	"	slender, glabrous	slender, glabrous, dark

The genus *AESCULUS* is distinguished in
SUMMER : by the opposite arrangement; large, palmately compound leaves without stipules; flowers
long-clawed.

WINTER : by the stout twigs; opposite arrangement; very large buds; and large, low, triangular leaf-scars.

Summer Key

Species	fruit	bud	leaflets	leaf edge	flowers	habit	petals
glabra	prickly	dry	5, obovate	serrate	yellowish with long stamens		eglandular, margin villous; nearly equal; claws longer than calyx
carnea	"	sticky subglobose at first	5-7, oblon., sub sessile, 7, obovate,	doubly serrate, obviously doubly serrate	salmon pink to scarlet		glandular, villous on margin
hippocastanum	prickly	sticky subglobose	sessile	doubly red, stamens exerted	white spotted	tree	5, claws not longer than calyx
octandra	smooth	dry	peltiolated	finely yellow, calyx	large petals unequal, calyx glandular-villous	tree	5, claws not longer than calyx
pavia	"	"	peltiolate, glabrous beneath	glandular-villous	large glandular-margined	small tree	petals unequal, calyx glandular-villous
parviflora	"	"	5-7, elliptic gray-pubescent beneath	reddish, calyx tubular	large shrub	4-5, $\frac{1}{2}$ length of the stamens or less	stamens long

Winter Key

species	buds	habit	bark	bud scales
hippocastanum	sticky	tree		
carnea	sticky, becoming dry	"		
glabra	dry	"	rough, soft, corky	
octandra	dry	"	smooth, firm	
pavia	dry	tree or shrub		lowest less than $\frac{1}{2}$ the length of the bud
parviflora	dry	shrub		lowest $\frac{1}{2}$ as long as the bud

ATLANTHUS ALTISSIMA* is distinguished in

SUMMER : leaves alternate, pinnately compound, estipular, margin toothed and with glands at the base of the leaflets; branchlets and petioles glabrous or slightly puberulous; leaflets glabrous on the under side; odor unpleasant when bruised; fruit winged, in paniculate clusters.

WINTER : leaf scars alternate, large; end-bud lacking; twigs yellowish, velvety; lateral buds solitary, smallish, hairy, with 2-4 scales, located close to the leaf scar; odor rank when cut or bruised.

The Genus **ALNUS** is recognized in
SUMMER : by the thick leaves with impressed, reticulate veination; stalked, axillary buds; cone-like fruits; and triangular twigs with a three-sided or triangular pith.

WINTER : by the stalked brown-violet buds with three valvate scales, almost triangular in cross section; twigs and pith triangular; woody cones persistent. Later - in early spring, the flowers with four stamens.

species	pistillate catkins	winter buds	flowers	twigs	cones	young growth	cone position	leaves
viridis	terminal, protected, within buds	sessile, with 2 or more unequal scales	with the leaves	more or less pubescent	having seeds with a broad membranous wing	glutinous	ovate, finely serrulate, broad cuneate, 5-10 pairs veins	
glutinosa	axillary, exposed	stalked, with 2-3 equal scales; leaves plicate	before the leaves	the glabrous, young growth peduncled very glutinous	all distinctly very glutinous	green beneath, obtuse, dentate, bearded		
rugosa	"	"	"	puberulent, rarely densely villous	puberulent, partly sessile	glutinous	upright	
incana	"	"	"	pubescent	sessile or stalked	tomentose or nearly glabrous	nodding	glaucous beneath or tomentose,
japonica	"	stalked, with 2-3 equal scales; leaves not plicate		glabrous or slightly pubescent	peduncled	glabrous	—	not bearded — or long-lanceolate, acuminate, cuneate, pointedly serrate, veins curved, thick bearded

Winter and Summer Keys combined -- **ALNUS**

ATLANTHUS

ALNUS

The Genus AMELANCHIER is recognized in

SUMMER : by the alternate leaves which are thin, light in color tone, simple, oval or oblong, with a finely serrate edge; flowers white, in loose racemes, with 5 slender petals; fruits small berry-like pomes, red or purple, sweet and edible.

WINTER : twigs slender, zigzag, red-gray; buds red, long, slender, sessile, with about 6 twisted scales; leaf-scars two-ranked, slightly elevated, crescent-shaped, with three bundle traces and no stipule scars.

species	styles	summit of ovary	sepals	habit	buds	leaves	bark	leaf form
ovalis	very short distinct							
floridana	prominent, joined at base, 5	woolly	short, recurved	shrubby, branches upright	blackish, stout	oval, glabrous, coarsely serrete above the middle		
laevigata	"	glabrous	erect	tree to 50-70'	more red than A. canadensis	coarsely callus- serrate, glabrous from the first, often	red-brown with dark lenticels; abruptly twigs pointed,	elliptical, acute or short
oblongifolia	"	"	erect, lance- deltoid	shrubby in dense clumps	bronze-purple	densely white-woolly when young	glabrous red-gray	oblong, rounded or acute or obovate, or
canadensis	"	"	ovate, reflexed almost erect	small tree 30-40'	slender, green or tinged brown	densely white-woolly when young; finely serrete	ash-gray with pale lenticels; acuminate young twigs	oblong, acute or obovate, or

Summer and Winter Keys combined -- AMELANCHIER

The Genus ASIMINA is distinguished in

SUMMER : by the large, alternate leaves, obovate-oblong, simple, entire, pinnately veined, anastomosing, estipular, short acuminate, cuneate; petiole short; flowers appearing with the leaves, axillary, solitary, deep red-violet, with 3 sepals and 6 petals; fruit a rather large, edible, oval to oblong berry with flattened seeds in 1-2 ranks, greenish-yellow turning brown.

WINTER : shrub or small tree with an unpleasant odor when bruised; twigs moderate, red-pubescent when young, becoming glabrous and brownish; pith terete, white, continuous, with greenish dia-phragms, becoming brownish and chambered; terminal bud naked, elongated, red-tomentose, lateral buds oblong or globose, sub sessile, oblique; leaf scars alternate, 2-ranked, $\frac{1}{2}$ -round becoming crescent shaped by rupture of membrane over buds, with 5-7 or more bundle traces and no stipule scars

Asimina triloba

The Genus *BETULA* is recognized in

SUMMER : leaves alternate, petioled, ovate, usually serrate; flowers monoecious, in catkins; fruit a minute nut with membranous wings, formed in conelike clusters with deciduous, leafy bracts which shed from the tip of the cluster.

WINTER : Twigs slender, zigzag, terete, frequently with dwarf shoots which make the lateral buds appear stalked; pith minute, triangular, greenish; buds moderate, solitary, tapering at both ends, with 2-3 exposed scales, imbricate; leaf scars alternate, half-elliptical, small, with two bundle traces and narrow stipule scars.

species	habit	bark	bark structure	branchlets	leaf tip	leaves	leaf edge	pubescence
<i>pumila</i>	shrubby	dark	densely tomentose, with long hairs	acute	obovate, 4-6 pairs veins,		pubescent when young	
<i>nana</i>	shrubby, low, spreading	"	glabrous, glandless	rounded	suborbicular, gland-dotted beneath, 4-6 pairs veins		glauberous	
<i>nigra</i>	tree	orange-brown	loose and shaggy	no odor or flavor, pubescent	rhombic-ovate, 7-9 pairs impressed veins, often white			
<i>lutea</i>	"	yellowish	splitting in filmy layers	pubescent, slightly flavored, bitterish	oblong-ovate, lighter beneath	tomentose under	oblong-ovate, finely serrate beneath, 7-9 pairs veins	pale hairs on veins above and below
<i>lenta</i>	"	red-brown	firm, cherry-like; not in layers	pubescent, resinous-glandular, glabrous	oblong-ovate, thinner beneath	oblong-ovate, thin light beneath, 7-9 pairs veins	sharply doubly serrate	
<i>populifolia</i>	"	chalky-white rubs off slightly	in layers	acuminatae, resinous-glandular, glabrous	acuminatae, resinous-glandular, glabrous	acuminatae, 3-7 pairs veins	deltoid, long acuminate, 3-7 pairs veins, glabrous	
<i>papyrifera</i>	"	white, rubs off freely, exfoliating	splits in thin layers; under ones cream to cinnamon color	acute	acute	ovate, base subcordate, veins hairy beneath	coarsely serrate not deep-where cut	hairy only
<i>pendula</i>	" eventually pendulous	creamy-white scarcely rubs off; exfoliating	fewer layers	resinous-glandular, glabrous	"	rhombic-ovate acuminate cuneate	serrate deeply cut	sheltered persistent leaves
								glutinous when young

The Genus GARYA * is distinguished in

SUMMER : trees with a hard, tough wood and scaly buds; leaves alternate, pinnately compound, the tip three leaflets larger than the lower ones, estipulate; flowers with the leaves, of two kinds on the same tree, in catkins, the staminate flowers in axillary, pendulous aments, the pistillate flowers sessile, in terminal spikes; fruit a nut in a 4-valved husk.

WINTER : twigs terete, stiffly held; buds rather large, sometimes stalked or superposed, the terminal bud much larger than the laterals, ovoid or oblong, with one to several exposed scales; leaf scars alternate, shield shaped or 3-lobed, large, low, with numerous bundle traces in about three more or less definite groups, and without stipule scars.

Species	bud scales	fruit with winged sutures	nut shell	leaflet	nut	winter buds	nut husk	leaves	bark	leaves & petioles	twig color
pecan	4-6 valvate	thin	7-17 falcate	nearly terete, shell thin, sweet	slender, elongated	splitting thin				tomentose, glandular when young	
cordiformis	4-6 valvate	thin	5-9 falcate	compressed stout, broad as glandular, bright yellow	splitting	to below middle					
laciniosa	imbricate, more than 6	sutures thick not winged	not falcate leaflets 7-9		outer scales persistent	splitting to base	7-9 leaflets	shaggy	glabrous or pubescent	pale orange	
ovata	"	"	" not falcate leaflets 5		"	very thick splitting to base	5 leaflets	shaggy	"	gray to light red-brown	
tomentosa*	"	"	not falcate	angled, kernel sweet	outer scales deciduous; bud large $\frac{1}{2}$ -1"	splitting to base	5-7 leaflets	firm, not shaggy	tomentose		
glabra	"	"	"	slightly angled, kernel bitter	small $\frac{1}{4}$ - $\frac{1}{2}$ "	thin, splitting only to middle	5, rarely 7 leaflets. glabrous	firm, not shaggy	glabrous		

The Genus CASTANEA is recognized in

SUMMER : leaves alternate, simple, straight-veined, oblong, rather acuminate to acute, coarsely serrate with bristle-like teeth; nuts enclosed in a prickly bur formed by the involucre;
nuts terete; staminate flowers in slender aments.

WINTER : by the moderate, stiff, more or less fluted twigs with a continuous star-shaped pith; bark gray, fissured, with smoothish ridges; buds ovoid, sessile, oblique, with 2-3 exposed scales; leaf scars alternate, scarcely raised, moderate to small in size, $\frac{1}{2}$ -round, with 3 bundle traces and with elongated, unequal stipule scars; twigs olive brown, polished or hairy.

Species	nuts	habit	branchlets	leaves	twigs
pumila	higher than broad, solitary in a spiny involucre	shrubby		elliptic-oblong, tomentose beneath	tomentose
dentata	broad than high, 2 or more in one involucre	tree	Glabrous	oblong-lanceolate, glabrous, base cuneate	olive-brown, polished
mollissima	"	"	short pubescent	elliptic-oblong, soft pubescent beneath, base rounded	dull, hairy

Summer and Winter Keys combined --- CASTANEA

The Genus CARPINUS is recognized in

SUMMER : leaves deciduous, alternate, simple, pinnately veined with 7-24 pairs straight veins, with the base symmetrical and the margin doubly toothed, more or less 2-ranked; fruit a small, ribbed nutlet enclosed in a 3-pronged involucre; fruits in a spike-like, drooping cluster, acute, with many imbricate scales in 4 rows.

GENUS	bark	bud scales	leaves	stamine catkins	involucre
Carpinus	smooth and firm	in 4 rows, not striate	ovate-oblong, glabrous except veins pilose beneath and with axillary tufts of hair	appearing in spring	3-cleft, leafy
Ostrya	rough and shredding in long strips	in 2 rows, striate	ovate to ovate-oblong, larger, sparingly hairy above and below	formed in autumn	a bladderlike closed bag

Summer and Winter Keys combined

The Genus CATALPA is recognized in

SUMMER : leaves very large, simple, ovate, long-petioled, with an acute to acuminate tip and entire margin; 3-5 veined at the base, usually with a purplish glandular spot in the vein-axils beneath; flowers white or yellowish in large, showy panicles; fruit a long, terete, 2-valved pod with thin, ciliate seeds wrapped around a central partition.

WINTER : twigs coarse, yellow to yellow-gray; leaf scars whorled, elliptical, raised, with many bundle traces arranged in an ellipse; buds comparatively small, solitary and sessile, with 6 or more loose, pointed scales; terminal bud lacking; fruits persistent.

species	habit	flowers	leaf form	leaf tip	seed wings	fruits	branches
bungei (or big-nonioides nana)	low, formal mound-top grafted	white in corymbose racemes	triangular-ovate, glabrous beneath	long-acuminate, base truncate			
ovata*	tall, loose spreading tree	yellowish	broad-ovate, 3-5 lobed, nearly			long, very slender, $1/8"$ diameter	glabrous
bignonioides	"	white, glabrous	glabrous not or seldom lobed, ovate, pubescent on veins below	abruptly acuminate	pointed ends	long, slender $1\frac{1}{4}"$ diameter	light brown, crooked and straggling
speciosa	"	"	not or seldom lobed, ovate, densely pubescent below	long acuminate	rounded ends	coarser, $\frac{1}{2}"$ diameter	red-brown, not crooked and straggling

Summer and Winter Keys combined --- CATALPA

GEDRELA SINENSIS : is distinguished in

SUMMER : leaves alternate, pinnately compound, eglandular, estipular, long petioled; leaflets 10-20, short-stalked, oblong to lance-oblong, acuminate, remotely serrate or entire, pubescent on the veins at first, becoming glabrous; flowers small, whitish, in large pendulous panicles; fruit an obovoid capsule with winged seeds.

WINTER : tree with smoothish or shredding bark; twigs coarse, terete, puberulous when young, with a large, rounded pith which is white at first becoming brownish; leaf scars large, alternate, heart-shaped, slightly raised, with 5 bundle traces and no stipule scars; buds solitary, sessile, subglobose, with 4 or more short pointed scales; end-bud much larger.

This tree is very similar to Ailanthus but easily distinguished therefrom by the large end-bud and by the absence of glands at the base of the leaflets.

The Genus *CELTIS* is recognized in

SUMMER : tree with a rough, corky, light gray bark; leaves simple, alternate, thin and rough to touch, ovate to ovate-lanceolate with an acuminate tip and oblique base, margin coarsely singly serrate, with 3 main veins at the base; fruit a small, globular drupe, with a date-like flavor; pith somewhat angular, occasionally chambered.

WINTER : unarmed; bark light gray, corky; twigs slender, zigzag, brownish, odorless; terminal bud lacking; leaf scars alternate, small, with one bundle trace (or appearing as one); pith rather angular, chambered in places; buds small, appressed, somewhat triangular.

species	bark	buds	leaves	
<i>occidentalis</i>	with thick, corky, long curly ridges with corky warts	long short	ovate to ovate-oblong, subcordate, sharply singly serrate, acuminate ovate to oblong-lanceolate, almost entire, long acuminate, base broad cuneate,	longer than the petiole shorter than the petiole
<i>laevigata</i> *				

Summer and Winter Keys combined -- *CELTIS*

CERCIDIPHYLLUM JAPONICUM is distinguished in

SUMMER : leaves opposite, simple, petiolate, suborbicular, obtusish, cordate, palmately veined, dark bluish-green above, glaucous beneath, margin crenate-serrate; twigs swollen at the nodes by the much raised leaf cushions.

WINTER : a small tree; twigs glabrous, much enlarged at the nodes; leaf scars opposite or $\frac{1}{4}$ -ranked, short spurs, moderate, raised, with 3 bundle traces and no stipule scars; buds often developing crescent-shaped, raised, with 3 bundle traces and no stipule scars; buds often developing short spurs, moderate, solitary, oblong, pointed, appressed, with one exposed scale.

CERCIS CANADENSIS is distinguished in

SUMMER : leaves alternate, simple, suborbicular, cordate, petiolate, entire, palmately veined, with small caducous stipules; flowers fascicled, before the leaves, rosy-pink, pealike, adventitious; fruit a flat legume, narrowly winged on the ventral suture. *C. occidentalis* has a flat legume, bark very dark with reddish fissures; twigs blackish, zigzag, pith rounded, continuous; leaf scars alternate, 2-ranked, somewhat raised, obtusely triangular, fringed at the top, with decurrent ridges, having 3 bundle traces and no stipule scars; buds glabrous, superposed, the upper stalked, the lower sessile, ovoid or obovoid, with 2 to several often keeled scales; end-bud lacking, flower buds adventitious.

CLADRASTIS LUTEA is distinguished in

SUMMER : leaves alternate, pinnately compound, estipular; leaflets alternate, short-stalked, rather large, elliptic to ovate, entire, short acuminate; petiole swelled to cover the bud; branchlets red-brown.

WINTER : tree with smooth bark and yellow wood; twigs red-brown; leaf scars alternate, almost encircling the bud, 2-ranked, C-shape, with 3-5 bundle traces and no stipule scars; buds naked, silvery brown hairy, in aggregates resembling single buds, sessile.

CELTIS -- *CERCIDIPHYLLUM* -- *CERCIS* -- *CLADRASTIS*

The Genus CORNUS (tree forms) is recognized in

SUMMER : leaves opposite, simple, entire, with the veins parallel, curving, and anastomosing, petiolate.
 (N.B. one species shows alternate arrangement); floral parts in fours; fruit a small drupe
 WINTER : by the rather slender twigs, terete, with a white, continuous pith; leaf scars opposite except
 in *C. alternifolia*, connected around the twig, crescent or V-shaped, raised on young wood, with
 3 bundle traces and no stipule scars; buds solitary, stalked, oblong, with two scales val-
 uate or nearly so; flower buds conspicuous for size and shape.

Summer Key

species	arrangement	fruit	flower-heads	leaves
<i>alternifolia</i>	alternate	blue-black, bloomy on red pedicels	terminal, loose, flat cymes, without an involucre	with 5-6 pairs veins veins, base cune- ate, margin entire
mas	opposite	red	opposite, terminal or axillary dense umbels, with involucre flowers yellow dense terminal cymes with showy white involucre notched at tip	green beneath, glabrous whitened beneath
<i>florida</i>	opposite	red	dense terminal cymes with showy white involucre pointed at tips	—
<i>kousa</i>	opposite	red, connate in globose head	—	glaucous beneath with large axillary tufts of hairs

Winter Key

species	leaf scars	leaf buds	flower buds	leaf axils	branchlets
<i>alternifolia</i>	alternate	—	—	—	—
<i>kousa</i>	opposite	concealed in leaf scars	enlarged	brown hairy	glabrous, greenish
<i>florida</i>	opposite raised	concealed in leaf scars	enlarged flattened lengthwise	not brown- hairy	reddish on upper side
mas	opposite	not concealed, very divergent	—	enlarged, ovate to obovate	—

The Genus CRATAEGUS is distinguished in

SUMMER : thorns long, stiff, sharp-pointed; leaves simple, alternate, stipulate, toothed or lobed; flowers in corymbs; fruit a pome-like drupe, with 1-5 bony nutlets.

WINTER : thorns long, stiff, sharp-pointed; buds short, stout, hard, with fleshy red scales.

species	leaves	fruit	veinuation	leaf edge	lobes	pétioles	anthers	thorns
<i>phaenopyrum</i>	deltoid, subcordate, subcoriaceous, with 5 lobes, glabrous	scarlet, with 5 nutlets, small corymbose	to points of lobes & sinuses	sharply serrate	3-5			long, slender
<i>oxyacantha</i>	broad ovate lobed, subglabrous	yellow, subglabrous	lower or secondary veins curved in	broadly serrulate	3-5 deep-cut			short or lacking
<i>monogyna</i>	to obovate, cuneate	ellipsoid, with 1 nutlet	secondary veins curved out	entire or few-toothed	3-7 or more deep-cut			"
<i>crusgalli</i>	yellow, beneath oval to obovate, to obovate, blue-green beneath	dull red, subglobous, with 1 nutlet	points of lobes	sharply serrate except near the base	not lobed	short		moderate, numerous, curved
<i>punctata</i>	not lobed, thick, & leathery, very glossy, cuneate	dull red, subglobous, without cavities and teeth on the 2 nutlets	without cavities and teeth on the 2 nutlets	impressed base	irregularly not or serrate			"
<i>succulenta</i>	obovate or oval, cuneate, dotted, dull surfaced	dotted red, ellipsoid, with 3-5 nutlets	irregularly not or serrate	very lit-margined	short, inflorescence villous	stout & short or wanting		
<i>coccinea</i>	broad-elliptic, not lobed, cuneate	subglobose, bright red with 3 nutlets, pulpy	coarsely dotted	slender	long & rose-color	long, stout		
	ovate, lobed, large acute, cuneate	globose, scarlet red, pulpy pubescent, 3-4 nutlets	" serrate	"	"	"		
			sharply lobed	moderate	yellow	stout, curved		
			serrate	"	"			

Summer and Winter Keys combined -- CRATAEGUS

DIOSPYROS VIRGINIANA is recognized in

SUMMER : leaves alternate, long, elliptic, drooping, entire, estipulate; flowers dioecious, regular, axillary, inconspicuous; fruit a several seeded berry with the calyx persistent, seeds flattened. bark checkered; young branchlets pubescent or glabrous; twigs moderate, terete, yellowish-white; buds ovoid, flattened, with 2-3 overlapping scales, solitary, sessile; terminal bud lacking.

The Genus FAGUS is distinguished in

SUMMER : bark smooth, gray; leaves alternate, simple, green beneath, 2-ranked, plicate in the bud, with strong, straight veins parallel and ending each in a tiny tooth; flowers of two kinds, the staminate in heads, the pistillate paired in a 4-parted involucre; fruit a triangular nut, in pairs in a prickly 4-parted involucre.

WINTER : bark silver-gray, smooth; buds slender, golden-brown, cigar-shaped.

Summer Key

species	veinuation	leaf edge	fall color	bark	color of veins and petioles	leaves
grandifolia*	9-14 pairs veins	coarsely serrate	yellow-bronze	very light gray	green	ovate-oblong, acuminate
sylvatica	5-9 pairs veins	remotely denticulate	red-bronze	medium gray	green	ovate or elliptic, acute
sylvatica purpurea	5-9 pairs veins	denticulate	red-bronze	deeper, purplish gray	red	"

Winter Key

species	twigs	buds	bud color	bark
grandifolia*	glabrous,	lustrous, elongated, with about 8 pairs of scales	yellow-brown, lustrous	light gray
sylvatica	villous	slightly puberulent	red-brown, silky dull	deeper, medium gray
sylvatica purpurea	villous	puberulent, moderate	deeper, red-brown	deep gray

The Genus FRAXINUS is distinguished in

SUMMER : trees with opposite, pinnately compound leaves, the margin toothed but not lobed; flowers small, in crowded panicles from the axils of last year's leaves; fruit a small nutlet with an elongated wing at the top.

WINTER : twigs stout, stiff, widely divergent; leaf scars rather large, opposite, $\frac{1}{2}$ -round to almost elliptical, with numerous bundle traces in an elliptical or C-shaped group and with no stipule scars; buds sessile, sometimes superposed, with 1-2 pairs of opposite scales.

Summer Key

species	twigs	lateral leaflets	rachis	parts	leaves beneath	leaf edge
<i>quadrangulata</i>	4-angled	7-11				
<i>nigra</i>	not 4-angled	7-11, oblong, sessile	with thick rufous tomentum without rufous tomentum		rusty-tomentose along the midrib Glabrous or pubescent on midrib only	serrate with small incurved teeth serrate
<i>excelsior</i>	not 4-angled	7-11, sessile				
<i>pennsylvanica</i>	not 4-angled	ovate to oblong, lanceolate, 5-9, petiolate	not winged	rusty- pubescent		
<i>lanceolata</i>	not 4-angled	elliptic-oblong, to lanceolate 5-9, petiolate	not winged	glabrous	glabrous, as green as the upper side	finely, sharply serrate
<i>americana</i>	not 4-angled	ovate, slender- petiolated, 5-9	not winged	glabrous	pale, glaucous	obscurely serrate or entire
twigs, petioles, veins, and buds						

Winter Key

species	twigs	buds	twig near tip	bud scales	bark	leaf scars	inner bark
<i>quadrangulata</i>	4-angled						
<i>excelsior</i>	not 4-angled	black or nearly so					turns water blue
<i>pennsylvanica</i>	not 4-angled	rusty tomentose, densely pointed at tip	pubescent				
<i>nigra</i>	not 4-angled	dark brown	not downy	3 pairs with apex apiculate	concave on top edge	inner surface reddish	
<i>lanceolata*</i>	not 4-angled	not downy	4 pairs with rounded apex	ridged	straight on top edge		
<i>americana</i>	not 4-angled	brown, very blunt at tip	not downy, 4 pairs with lustrous apex rounded	ridged, not flaky rounded apex	upper edge —	yellowish	
					not flaky	deeply concave	

GINKGO BILoba is recognized in
SUMMER : leaves alternate, clustered on short spurs, fan-shaped, slender petioled, more or less incised at the tip, striated by the parallel veins.
WINTER : branches irregularly placed and without lateral twigs near the tips; twigs yellow-gray, moderate, rounded; leaf scars alternate, crowded on short spurs, crescent-shaped, low, with 2 bundle traces and no stipule scars; buds brown, solitary, sessile, hemispherical with three or more scales.

GLEDTISIA TRIACANTHOS is recognized in
SUMMER : a large tree armed with stout, much branched spines which persist on the trunk; leaves alternate, often fascicled, pinnate or bi-pinnate on the same tree; leaflets small, obtusish, elliptic to oblong-lanceolate, entire; flowers in small, greenish racemes, inconspicuous; fruit a long, twisted, red-brown legume, indehiscent, many-seeded.
WINTER : spines numerous and much-branched, very large; twigs zigzag, moderate, with swollen nodes; leaf scars comparatively large, irregularly shield-shaped, rimmed red and appearing sore and inflamed; buds glabrous, sessile, superposed, often more or less covered by the torn margin of the leaf scar, with few scales; end-bud lacking.

GYMNOCLADUS DIOICUS is recognized in
SUMMER : leaves alternate, doubly pinnately compound, very large; leaflets ovate, of medium size, acute, rounded at the base, short-stalked, entire; flowers of two kinds, greenish and inconspicuous; fruit a short, thick and broad, beanlike pod, with several suborbicular seeds.
WINTER : tree, unarmed, with stout branches and a gray bark which appears as though of many small flakes rolled up on one edge; twigs thick, glossy, buds minute, superposed, set in tiny, silvery craters, removed from the leaf scar as much as $1/8$ " or more; leaf scars alternate, large, irregularly heart-shaped, little raised, with 3-5 large, rather indefinite bundle traces and sometimes with minute stipule scars fringed at the top.

*HALESTIA CAROLINA** is recognized in
SUMMER : a large shrub or small tree with the bark shredding and marked by whitish fissures; leaves alternate, simple, elliptic to ovate-oblong, finely serrate, acute or acuminate, base cuneate or rounded, estipular, tomentose at first, becoming glabrous above but remaining pubescent below; flowers white, often tinged pink, bell-shaped, puberulous, pendulous in axillary clusters on last year's wood; fruit an obovoid-oblong dry drupe with four longitudinal wings and with the tip elongated in a point.
WINTER : bark gray or brown-gray marked with whitish fissures; twigs moderate, with a stellate-scurfy bark which shreds off in fine, hairlike threads; pith smallish, terete, white, finally chambered; leaf scars alternate, moderate, somewhat raised, $\frac{1}{2}$ -round, notched, with one crescent-shaped bundle trace and no stipule scars; buds moderate, superposed, ovoid, with about four fleshy red scales.

The Genus JUGLANS is distinguished in
SUMMER : leaves alternate, pinnately compound, estipulate, with numerous opposite leaflets, aromatic, serrate or entire; monoecious flowers in catkins, the staminate lateral and drooping, the pistillate in terminal racemes in the axils of bracts; fruit a nut with an indehiscent husk.

WINTER : trees with stout, more or less fluted twigs; pith chambered with rather close, thin plates; leaf scars alternate, rather large, shield-shaped or three lobed, raised, with 3 compound bundle traces and no stipule scars; buds moderate, sessile, velvety, with few scales, superposed, the terminal bud much larger than the lateral ones.

Winter Key

species	bark	pith	terminal bud	leaf scar	twigs	buds	pith diaphragms
<i>cinernea</i>	light gray with wide smooth margins dark, with rough ridges	chocolate brown creamy	elongated	with a downy ridge, not notched	moderate, pubescent, glandular	slender	
<i>sieboldiana</i>	"	"	elongated	with a downy ridge, and notched without a downy ridge	very stout	stout	
<i>nigra</i>	"	"	short	"	gray-pubescent	canescent	close together
<i>regia</i>	light gray, smooth	"	"	"	glabrate	widely spaced (8 to 1")	

Summer Key							
species	leaflets	pith diaphragms	terminal leaflet	fruit surface	nut	pith color	
<i>regia</i>	entire or nearly so, glabrous, 7-9	widely spaced		glabrous	wrinkled but not rough, with thin partition	creamy	
<i>nigra</i>	serrate	closely spaced	often not developed	glabrous	ridged, rough, with thick, bony partition	creamy	
<i>sieboldiana</i>	"	"	well developed	sticky-hairy	rugose or nearly smooth	creamy	
<i>cinernea</i>	glandular, pubescent, with spreading teeth	"	"	"	elongated, ridged	chocolate brown	

KALOPanax PICTUS is recognized thus
SUMMER : a tree with stout, prickly branches; leaves alternate, simple, palmately veined and lobed, suborbicular, 5-7 lobed, with very long petioles, lobes acuminate and serrate; flowers small, whitish, in umbels; fruit a 2-seeded drupe, subglobose, bluish-black.
WINTER : tree with coarse branches and thick twigs, armed with numerous short, stout prickles, these found both on nodes and internodes; twigs terete, often forming spurs; pith moderate, large, continuous, white; leaf scars alternate, narrowly crescent-shaped or U-shaped, somewhat raised, with 5 small bundle traces and no stipule scars; buds solitary, sessile, conical-ovoid, with about three, exposed, thin scales.

KOELREUTERIA PANICULATA is recognized thus
SUMMER : an unarmed small tree; leaves alternate, pinnately or bi-pinnately compound; leaflets 7-15, serrate, hairy, occasionally glabrous, coarsely and irregularly crenate-serrate, at the base often incisely lobed; flowers yellow, small, in large, loose panicles in midsummer; fruit an oblong-ovoid, 3-valved, bladder-like capsule with papery walls and with 3 roundish, black seeds.
WINTER : twigs moderate, orange-brown, lenticular; pith rounded, continuous, white; leaf scars alternately raised, rather large, shield-shaped, with 3 compound bundle traces or a jagged, irregular series, and without stipule scars; buds moderate, solitary, $\frac{1}{2}$ -ellipsoid, sessile, set at almost right angles to the twig, and with 2 exposed scales; end-bud lacking.

*LABURNUM ANAGYROIDES** is recognized thus

SUMMER : leaves alternate, palmately compound, with 3 leaflets, petiolate; leaflets elliptic-obovate, ciliate with silky hairs, subsessile, obtuse, broadly cuneate; flowers yellow, in pendulous terminal racemes, pealike; fruit a legume, with a thick keel, appressed-pubescent, compressed, dehiscent.
WINTER : twigs slender, green, appressed-pubescent, terete, or slightly fluted; leaf scars alternate or rarely opposite, small, elevated, transversely elliptical, with 3 bundle traces confluent or indistinct, and the stipules persistent on the leafy cushion; buds moderate, solitary, sessile, silvery silky-hairy, ovoid, with 2-4 outer scales scarred at the top.

The Genus *MALUS* is distinguished thus

SUMMER : trees without true spines but with often thornlike spurs; leaves alternate, simple, sometimes lobed, toothed on the margin, with small, soon falling stipules; flowers regular, in umbellike clusters; fruit a fleshy pome.

WINTER : twigs moderate, rounded, somewhat spinescent, usually dull, deep red in color; leaf scars alternate, raised, or the nodes swollen below them, linear or U-shaped, with 3 bundle traces keeled above and imbricate, end-bud, sometimes lacking.

species	leaves in bud	calyx lobes	styles	pedicels	leaves	flowers	fruit
prunifolia	rolled persistent	longer than tube acuminate	dull, flat, sharply acute	—	dull, flat, sharply acute	glossy, with a fleshy base	ovoid, attenuate
spectabilis	" "	shorter than tube, acute	—	—	pubescent	lustrous, brood crisp, cuneate	—
baccata	deciduous	longer than tube, narrow-lanceolate, acute	rarely 4	—	glabrescent	glabrous, semi- ciliate	slender, cuneate
halliana	" "	shorter than tube, triangular-ovate, obtuse	4-5	—	glabrous	glabrous, semi- ciliate	white, buds cherry-red
syriaca	folded persistent	tomentose, reflexed,	at villous base	—	less or less tomentose below, crenate-serrate	margins closely seriate or entire	white or pink
ioensis	" "	tomentose erect or spreading	"	—	" or less tomentose below, more	more	small, pyramidal, form
angustifolia	" "	glabrous	"	—	tomentose below, more	more	large, usually
coronaria	" "	"	"	"	slender	hard, thin, oblong granate-serrate	greenish, greasy
torin-goides	deciduous	glabrous without puberulent without	3-4, glabrous	unduly dull red	slender, unduly lobed, partly 3-lobed	acute, hard, thin, fragrant	fragrant
floribunda	"	glabrous or puberulent	"	glabrous	never lobed, base cuneate, ovate or oblong, acute, irreg- ularly serrate	intense car- mine in bud, pink in blossoms, first to bloom	red or yellow, small
arnoldiana	" "	"	"	"	never lobed, base cuneate, ovate or oblong, acute, irreg- ularly serrate	intense car- mine in bud, pink in blossoms, first to bloom	very small orange-yellow
schiedeckeri	" "	pubescent	"	"	"	"	—
sargentii	" "	glabrous without pubescent within	villous base	glabrous	often lobed, ser- rate, habit low, spreading	suborbicular petals, pink fading except margins	medium, diam. —
zumul	" "	"	"	"	entire, only up- per lobed	petals base of sepals long	medium, diam. —
sieboldii	" "	"	"	"	all lobed and serrate	petals pink, cuneate, sepal as tube or long	dark

The Genus *MORUS* is recognized thus
 SUMMER : leaves alternate, simple or variously lobed, coarsely toothed, with 3-5 veins at the base, broadly ovate, with lanceolate, deciduous stipules; flowers in stalked, axillary, drooping catkins; fruit an aggregate of drupe-like achenes, resembling a blackberry, sweet, edible.
 WINTER : trees with a scant, milky sap; twigs moderate, terete, with a continuous pith; leaf scars alternate, round or half-round or rather triangular, slightly raised, with numerous bundle traces scattered or in an ellipse, and with narrow stipule scars, of which the one below the bud is the larger; buds sessile, solitary or laterally multiple, ovoid, oblique, with about 3-6 2-ranked thin scales; end-bud lacking.

species	leaves	buds	leaf base	bark	fruit	habit
alba	smooth above with axillary hairs beneath, glossy colored	triangular, ovoid, short, buff yellow, scales uniformly colored			yellow to orange	white, pink, or purplish spreading tree
rubra	scabrous above, pubescent beneath, sharply serrate	buds more elongated, somewhat spreading, green scales dark-margined	truncate or slightly cordate	darker	—	ovoid to tree —

MYRICA CERIFERA : see key for Myrica in shrub section.
NYSSA SYLVATICA : is recognized thus

SUMMER : tree; leaves alternate, simple, obovate or oblong, entire, acute or obtusish, cuneate, lustrous above, glaucous beneath, glabrous; flowers inconspicuous, small, greenish on hairy peduncles, polygamo-dioecious, in axillary clusters; fruit an oblong-ovoid, blue drupe.
 WINTER : mature branches spreading horizontally; twigs moderate, terete, glabrescent to glabrous; pith white, continuous, crossed by dia phragms; leaf scars alternate, broadly crescent-shaped or triangular, sometimes becoming U-shaped by rupture of a tegument, with 3 bundle traces and no stipule scars.

OSTRYA VIRGINIANA is recognized thus

SUMMER : leaves medium sized, oblong-ovate to ovate, alternate, simple, pinnately veined, subcordate base, margin doubly serrate; flowers without perianth, the staminate pendulous, with 3-14 stamens, the pistillate aments, upright; fruit a ribbed nutlet in a bladderlike involucrum with stiff hairs at the base, in a pendulous raceme.
 WINTER : small tree with brown scaly bark which peels in long stripes; twigs slender, zigzag, with pale pith; leaf scars alternate, 2-ranked, slightly raised, small, crescent-shaped or $\frac{1}{2}$ -elliptical, with 3 bundle traces and with elongated, unequal stipule scars; buds ovoid, pointed, with many imbricate scales in two rows, sessile, solitary, rarely superposed, oblique, end-bud lacking.

*PAULOWNIA TOMENTOSA** is recognized thus

SUMMER : tree; leaves opposite or whorled, large, ovate, palmately veined, petiole often hollow, upper side pubescent, with minute cup-shaped glands at the base of the veins; flowers violet, in large panicles, fragrant; fruit an ovate, pointed capsule.
 WINTER : twigs stout, resembling Catalpa, compressed at nodes; pith large, white, terete, chambered or excavated in the internodes; leaf scars opposite, subelliptical, more or less notched at top, raised, with many bundle traces in an almost completed ellipse, and no stipule scars.

The Genus PHELIODENDRON is recognized thus

SUMMER : by the opposite arrangement; leaves pinnately compound, with opposite, crenulate leaflets, punctate with pellucid dots, aromatic with a turpentine-like odor; buds concealed in the base of the petiole; flowers dioecious, small, greenish, in terminal panicles or coryms.

WINTER : aromatic trees; bark yellow when cut; twigs moderate, terete, with a brown, continuous pith; leaf scars opposite or almost opposite, horseshoe shaped, raised, medium large, with 3 bundle traces which may be compound, and no stipule scars, naked, solitary, sessile, lustrous silky red-brown, the silky hairs covering the overlapping of the two scales, flattened vertically and almost surrounded by the leaf scar.

Summer Key

species	margin	upper side of leaves	under side	base of leaflets	leaf rachis	inflorescence
amurense	ciliate	lustrous	Glabrous, Glaucous glabrous	rounded		
sachalinense	not or sparing- ly ciliate	dull		cuneate or rounded		puberulous
Japonicum		dull	gray-villous	truncate or subcordate, oblique	densely tomentose, leaves broadly ovate	Glabrous hoary- tomentose

Winter Key

species	twig color	lower bark	twig texture	fruit clusters
amurense	orange	thick, corky, light gray	glabrous	
sachalinense	red-brown	thin, not corky, dark brown	glabrous	branched, winter buds red-downy
Japonicum	red-brown	thin, not corky, dark brown	pubescent	distinctly branched

The Genus PLATANUS is recognized thus

summer : arrangement alternate; leaves large, palmately 3-5 lobed, coarsely and acutely toothed; long petiole with the buds concealed in the base of the petiole, the stipules sheathing with the petiole margin; fruits in globose, long-stalked aggregates.

WINTER : Large trees with the bark exfoliating in large, thin plates; twigs moderate, terete, glabrous, buff colored, zigzag, with a continuous pith; leaf scars alternate, 2-ranked, raised, scalloped, and completely encircling the buds, with 5 or more rather large bundle traces, and narrow stipule scars encircling the twig; buds solitary, sessile, large, conical, with a single closed scale; the end-bud lacking.

Summer and Winter Keys combined (fruit and bark constitute winter identification)

species	fruit heads	leaves	sinus	seeds	leaf	edge	base	bark	petioles
orientalis	racemose, 3 or more per pedicel, bristly	usually with 5 main veins, seldom 3	deep-cut	pointed	dentate	wedge or heart-shaped	scales very freely, greenish- white	green	
acerifolia	two, race- mose, bristly (rarely 3)	3-5 lobes, moderate middle lobe about as long as broad	—	—	coarsely toothed	truncate	scales freely	greenish white, mottled	young growth densely brown
occidentalis	usually solitary, smoothish	with 3 main veins (rarely 5), downy be- neath, lobes longer than broad	shallow	blunt	—	deeply cordate	scales less freely hardly at all from young trees, almost white	tomentose	young growth densely brown

The Genus **POPULUS** is recognized thus

SUMMER : trees with a furrowed, light colored bark and rounded terminal bud usually present; leaves alternate, long-stalked, petioles usually flattened, ovate, triangular or rhomboid in shape, margin dentate or serrate; flowers in pendulous catkins before the leaves; fruits ripening before leaves are fully out.

Summer Key

species	under side of leaves	buds	leaf form	leaf border	petioles	leaves	branches	leaf margin	leaf base
alba	white or gray	tomentose	lobed						
simoni	tomentose waxy	glabrous	not tomentose	not translucent	terete, compressed	rhombic-ovate to obovate, glabrous	angled	crenate-ser- rule	cuneate
deltoides	"	glabrous	"	"	"	broadly deltoid- ovate	not "	coarsely cren- ate-serrate,	truncate,
tremuloides	"	"	"	"	"	ovate to orb- cular, short	curved	teeth curved	entire
grandidentata	"	"	"	"	"	acuminate, small, thin, less than 3"	"	finely glandular- serrate	cordate or sub- cordate
nigra	"	"	"	translucent	"	ovate, large 3-5" long	"	slightly sin- uate-dentate, teeth callus- mucronate	truncate to broad cuneate
candidans*	"	"	"	"	"	rhombic-ovate	not angled	crenate- without glands	cuneate, cordate, with glands

The Genus **POPULUS** is recognized thus
WINTER : deciduous trees with the upper bark smooth and colored greenish, or whitish or orange, and
the lower bark gray and deeply fissured; twigs moderate or coarse, terete or $\frac{5}{4}$ -angled; pith
rather small, $\frac{5}{4}$ -angled, brownish, almost continuous; leaf scars alternate, on raised cushions,
broadly crescent shaped or triangular, inclined to be $\frac{3}{4}$ -lobed, with 3 bundle traces and
narrow stipule scars; buds moderate to small, the terminal one enlarged, appressed or curved
out, sessile, solitary, with the lowermost scale centered over the leaf scar, usually resinous;
terminal bud present; catkin scales laciniate.

Winter Key

species	twigs	buds	lateral buds	branchlets	bark
<i>alba</i>	white-downy	white downy		white downy when young	whitish or greenish-gray
<i>simoni</i>	glabrous, ridged or angled	pointed, erect, not white-downy		yellowish, slender, terete, angled	yellow-gray
<i>grandidentata</i>	gray-tomentose at first, then glabrous	puberulous to pubescent, dusty, ovoid	widely divergent	red-brown, rather coarse	upper bark light, greenish
<i>tremuloides</i>	glabrous, not ridged	ovoid, pointed, glabrous, lustrous, slightly viscid	more or less appressed, plump	red-brown, slender	greenish
<i>deltoides</i>	glabrous, not ridged	very long, sticky-resinous, pointed, brownish	not fragrant	usually yellow, crooked and distorted	upper bark orange
<i>candidans*</i>	terete, glabrous	"	fragrant	red-brown, not so distorted	—
<i>nigra</i>	glabrous, terete	elongated, viscid, red-brown, curving out at apex	not fragrant, curving out at apex	orange to ash-gray	—

The Genus *Prunus* is recognized thus

SUMMER : leaves alternate, serrate, stipulate; flowers solitary, fascicled, or in racemes, floral parts in 5's, perfect, usually white or pink or red, with numerous stamens and one pistil;

WINTER : fruit a one-seeded drupe.

WINTER : trees or shrubs having a characteristic bark with long, prominent lenticels, usually almond flavored; twigs slender or moderate, rounded or angled from the nodes, pith continuous; leaf scars alternate, small, half-round or half-elliptical, with 3 minute bundle traces subtended by stipule scars or by the remains of the stipules; buds usually collaterally clustered or occasionally solitary, slender ovoid, sessile, with about 6 exposed scales; end-bud sometimes lacking; leaf scars raised on a cushion.

Key to Sub-Genera

group	terminal bud	axillary leaves	flowers and fruit	fruit	stone	buds
I plums	lacking, scar left	solitary	rolled in bud	Glabrous and glaucous, from winter-buds pedicelled, glabrous	compressed, not furrowed	longer than broad
II apricots	"	"	finely serrate, pairs, before leaves, rolled in the bud	pubescent, pedicel separating at or before maturity	smooth, margin grooved	
III almonds and peaches	present	3, lateral ones flower buds	folded in sessile, rarely stalked, solitary petiole usually glandular	very pubescent, pedicel separating at maturity	furrowed and pitted	round ovoid
IV umbellate cherries	"	"	— — — —	in umbels or solitary, with the leaves from winter buds	globular, small, globular	
V racemose cherries	"	"	— — — —	terminal racemes elongated, with the leaves, flowers small, white	globular, small, peduncle usually leafy	globular, not furrowed

Summer and Winter Keys combined

PLUMS

species	leaves	veins	under side of leaves	fruit	buds	twigs	foliage	petiole	termin- al bud
<i>domestica</i>	broad, net-veined, spreading	numerous, at a wide angle pubescent	elliptical pubescent	blue-black, light brown	glabrous cent-	glabres-	without glands	lacking	
<i>cerasifera</i>	"	glabrous except midrib	yellow or velvety, acute	red,	slender,	green	"	"	
<i>cerasifera</i> <i>pissardi</i>	broad-ovate, acuminate	"	dark cherry-like	wine-red	dark brown	—	dark purple	"	"

ALMONDS & PEACHES

species	fruit	habit	leaves	bud	twigs	stipules	petioles	fruit stone
<i>persica</i>	pubescent at maturity	tree	oplong-lanceolate, glabrous, serrate	hairy red, glabrous	—	—	glandular	deeply pitted
<i>triloba</i>	"	shrubby	broad-ovate, tends to be 3-lobed, deep-seriate	glabrate, dark brown	—	—	—	with thick, bony smell
<i>davidiana</i>	"	tree	ovate-lanceolate, long acuminate, finely sharp-serrate, glabrous	glabrous, red-brown	—	—	glands underdeveloped	free small pitted

UMBELLATE CHERRIES

species	buds	fruit	foliage	twigs	habit	buds	stipules	bud form	leaves
<i>tomentosa</i>	three to-gether	glabrate, red at maturity, almost sessile	tomentose beneath	hairy dark brown	low shrubby tree	clustered loosely hairy	persistent or broken bristlelike	loosely crowded above base acute	crowded, rugose dull ovovate, or elliptic, unequally serrate
<i>glandulosa</i>	"	subglobose, red, glabrous pedicels about $\frac{1}{2}$ in. long	glabrous beneath or slightly puberulous	—	shrubby	sessile or stalked	—	ovate-oblong to oblong-lanceolate acute or cuneate	ovate or oblong
<i>avium</i>	soli-tary	glabrous pedicels red-	not tomentose	glabrous tall	on short spurs	—	—	ovoid-globose	crenate-serrate
<i>cerasus</i>	"	sepal's reflexed	—	—	—	—	—	ovoid, round, glossy	oblong-ovate, drooping
<i>subhirtella</i>	involute, persis-tent	black, sepals erect or spreading, emarginate	hairy pubescent on veins	tall tree when young	"	"	—	ovate, abruptly stiff spreading	oblong-ovate or short acuminate, doubly serrate

PRUNUS — continued.

RACEMOSE CHERRIES

species	habit	foliage	fruit	bud	twigs	leaves	bark	flowers	calyx
Pennsylvani- anica	tree	glabrous	sub-umbel- late, red, sour	straw-colored	red, shining slender	oblong-lanceolate, finely serrate, often gland- tipped	oblong-lanceolate at 1st to wine- red	deciduous	
virgin- iana	"	"	racemes	dull light brown, scales smooth	red-brown glabrous	elliptic to ovate, glauces- cent beneath	grayish	deciduous tube glabrous	
padus	"	"	racemes	dark red, astringent pit smooth	oval-oblong, soft, velvety, brown	serrate, abruptly acuminate, grayed beneath	"	outside deciduous tube pub- escent	
sero- tina	"	"	racemes	black astringent pit rugose	appressed, smooth	"	large, spread- ing or drooping, petals twice inside	length of stamens — small in — long racemes	— persis- tent

N.B. *Prunus padus* is very like *P. virginiana* but has larger flowers on longer pedicels, in racemes which are looser, often drooping, and somewhat leafy. (from L.H.Bailey)

PIRUS COMMUNIS is recognized thus

SUMMER : leaves alternate, simple, toothed but not lobed, petiolate, stipulate, orbicular-ovate to oblong-ovate, subcordate to broad cuneate, crenate-serrulate, glabrous, with a hard and lustrous surface; flowers fairly large, white with brownish stamens, long-pedicelled, nearly glabrous; fruit pyriform, pome, with grit cells.

WINTER : a broad pyramidal tree, the young branchlets glabrous, occasionally ending in spines; twigs continuous, color yellow-brown, shiny; leaf scars alternate, somewhat raised or the nodes swollen beneath them, linear or U-shaped, with three bundle traces and no stipule scars; buds moderate, solitary, sessile, with about 4 mucronate scales more or less keeled above; end-bud sometimes lacking.

PRUNUS — cont'd — **PIRUS**

The Genus *QUERCUS* is recognized in
SUMMER : leaves short-petioled, pinnately veined, simple or lobed, margin toothed or rarely entire;
stamine flowers in catkins; fruit an acorn; buds multiple at ends of twigs, with many
scales, lateral buds generally smaller and solitary; twigs fluted.

species	fruit	lobes	leaves	bark	fruit	leaf form	buds	acorn cup	leaf base	leaf surface
marian-dica	matures acute bristle tipped	deep-cut lobed	deeply furrowed, scaly, inner bark [not yellow]	broadly obovate	rusty hairy	rusty hairy	scales	rounded	brown tomentose beneath	brown tomentose beneath
veluti-na	" "	" thick, leathery	[cut in near] square plates, inner yellow	ovovate to oblong	hoary to tomentose, angular	hoary to tomentose, angular	scales	cuneate to truncate	pubescent to glabrous beneath	pubescent to glabrous beneath
ellipsoidalis	" "	deep-cut or lobed	inner bark yellow	elliptic	lustrious, slightly angular	elliptic, ellipsoid, brown hairy	truncat-	truncat-	glabrous beneath	glabrous beneath
coccinea	" "	deep-cut thin	inner bark red	—	elliptic —	not angular, pubescent	or broad	cuneate	lustrous above	lustrous above
palustris	" "	"	"	—	elliptic —	upper half pubescent	cuneate	"	"	"
borealis	" "	"	"	—	elliptic —	saucer-shaped	cuneate	"	"	"
maxima	" "	"	"	—	elliptic —	sinus and lobe sides parallel	cuneate	"	"	"
phellos	" "	entire not lobed	"	—	oblong spreading	oblong sinus broad spreading	cuneate	"	"	"
imbricaria	" "	" margin thickened	firm	nearly sessile	linear-oblong	—	cuneate	"	"	"
bicolor	matures pointed first season	sinuate not lobed	thin scaly, curling, not cut or lobed	peduncle short	long to lanceolate	—	cuneate	"	"	"
muhlenbergii	" "	"	not scal'y curling	petiolate obovate	turbinate	—	cuneate	"	"	"
prinus	" "	"	"	petiolate obovate	—	—	cuneate	"	"	"
prinoides	"	teeth obtusish	habit shrubby	sessile	oblong-oblong	—	cuneate	"	"	"
macrocarpa	rounded deep cut	lower half lobed fan-shaped	—	sessile	ovate-oblong	—	cuneate	"	"	"
alba	" "	—	not corky-ridged	ovate	oblong	fringed	cuneate	"	"	"
robur	" "	"	deepcut, rounded	peduncles short	very short	—	cuneate	"	"	"
			"	peduncles longer	—	—	auriculate	"	"	"

The Genus *QUERCUS* is recognized in
WINTER : twigs moderate, fluted; pith star-shaped in cross section; leaf scars multiple, rather small, half round, slightly elevated, with 10 or 12 scattered bundle traces and small stipule scars; buds solitary or laterally multiple, sessile, globose, ovoid, or conical, with numerous 5-ranked scales.

species	twigs	acorn	branch buds	acorn cup	fruit pedicel	bark	bud scales	nut	bud apex	twig color
<i>macrocarpa</i>	thick tomentose	sweet, matures 1st season	corky ridged pale pubescent all over	1/8" ellipsoid, fringed at rim						gray pubescent
<i>bicolor</i>	glabrous	"	shaggy 1/8" only upper pubescent, conical, slightly grooved	not fringed	1/4" long pubescent, short, stout	thin scaly curling				
<i>prinoides</i>	"	"	not shaggy	"	flaky	light gray	pale marginated	oblong, acute	acute	acute
<i>muhlenbergii</i>	"	"	ovoid or conical - hot	fringed	"	light gray	acute	acute	acute	red-brown
<i>alba</i>	"	"	ovoid, brown' puberulent or glabrous	"	light gray tree form	"	apex down	oblong	obtuse	gray or purplish reddish
<i>robur</i>	"	"	conical, only up per 2 pubescent	"	"	not pale	acute	acute	acute	cladrous
<i>imbricaria</i>	glabrescent	matures 2nd season	178", ovoid red-brown, terete, glabrous	"	short	"	oblong hairy	not marginated	acute	light brown
<i>palustris</i>	glabrous	"	1/8", stout, ovoid, dark brown, slightly angular, lateral buds	"	long	dark gray	acute	acute	acute	light brown
<i>phellos</i>	"	"	slightly angular, divergent	"	smooth	firm	pale	acute	acute	light brown
<i>borealis</i>	"	"	widely divergent	"	brown smoothish		obtuse	acute	acute	light brown
<i>maxima</i>	"	"	1/8", glabrous, lustreless, more or less appressed	"	brown or green smoothish		hemispherical	acute	acute	red-brown
<i>elliptica</i>	"	"	medium, small, brown, glabrous	"						
<i>marilandica</i>	puberulent	"	very acute	"	saucer-shaped very flat	inner whitish				
<i>velutina</i>	glabrous	"	"	"	inner light yellow	kernel yellow				
<i>coccinea</i>	"	"	"	"	not yellow	acute				
					inner tomentose, angular, large	tomentose	obtuse	acute	acute	
					upper half pubescent, dark red-brown	inner red	obtuse	acute	acute	

The Genus ROBINIA is recognized thus

SUMMER : leaves pinnately compound, alternate, petiolate, stipulate; leaflets opposite, short stalked, with stipule-like appendages (stipels), elliptic; flowers in racemes, pealike; fruit a pod, 2-valved, flat, linear-oblong, with several seeds.

WINTER : trees or shrubs; twigs zigzag, more or less angular, with two prickles at each node, pith round, brownish, continuous; leaf scars alternate, broadly triangular or 3-lobed, with 3 bundle traces; stipules persistent in the form of paired spines; buds small, superposed, covered by a membrane; end-bud lacking.

Summer Key

species	flowers	branchlets	fruits	leaflets
pseudoacacia	white	glabrous	smooth pods	elliptic or ovate, 7-19 glabrous
hispida	pink to purple	hispid, sometimes glabrous	—	less than 15, glabrous, suborbicular to oval, apex rounded
viscosa	"	glandular-viscid	—	more than 15, ovate rachis glandular or viscid

Winter Key

species	habit	twigs	thorns
hispida	shrubby	very bristly, not viscid nor glandular	—
viscosa	tree	densely glandular-viscid	stipular thorns small or lacking
pseudoacacia	tree	glabrous, not glandular	2 stipular prickles at each node



The Genus *SALIX* is much involved and exceedingly difficult to identify absolutely. But it is possible to know the species in this chart sufficiently to recognize them readily in summer and fairly well in winter. *SALIX* is usually identified by the buds which have one bud scale opening on the inside next the stipule; flowers in aments; fruit a 2-valved capsule, formed in spring.

species	habit	leaves	fruit	number of stamens	petioles	twigs	flowers	stipules	buds
<i>babylonica</i>	decidedly pendulous	lanceolate, finely serrate, glabrous, glaucous beneath			not glandular	olive-green, not bloomy			
<i>alba</i>	large tree	lanceolate, serrate, pubescent beneath		two	obscurely glandular	green or brown			
<i>vitellina</i>	"	"				bright yellow			
<i>nigra</i>	"	linear-lanceolate, closely serrate, glabrous, green both sides		"	"	"			
<i>amygdaloidea</i>	"	lanceolate, serrate, glaucous beneath, glabrous		3-5	not glandular & slender & terete				
<i>incana</i>	often shrubby	long-linear, revolute, white tomentose beneath		"	glandular slender, terete				
<i>caprea</i>	"	broad & short, white tomentose beneath			glandless	villous, reddish brown	before leaves on winter branches	lacking	
<i>discolor</i>	"	oblong to obovate, serrate, acuminate, cuneate, glaucous		"		red and green blackish with a red cast	prominent	large, stout, red	
<i>pentandra</i>	"	broad ovate to long-ovate, smooth, glossy, glandular-serrate, fragrant when bruised, acuminate						large but more slender, almost black	
<i>lucida</i>	"	ovate-lanceolate, pubescent at first, later glossy, broad & smooth, serrate, long-acuminate glabrous		more than 3	lustrous straw color, cordate, base tapering gradually	polished with or after leaves on short, lateral leafy shoots	"	"	
				"	dull straw-colored or cuneate, bottle-necked	dull green	"	larger	

WINTER identification for the Genus SALIX
 shrubs or trees; young bark smooth and colorful, green, gray, yellow, or red; twigs very flexible lustrous, slender, terete, with a continuous pith; leaf scars alternate, low, U-shaped, with 3 bundle traces; stipule scars short or wanting; buds mostly small, oblong, appressed, sessile, solitary, with a single scale opening on the inside next the twig.

species	habit	twigs	twig color	lateral buds	catkins
babylonica	tree, pendulous	slender, whiplike	yellowish		
alba	erect tree	slender, flexible, break easily	greenish	appressed, gibbous	
vitellina	"	"	bright yellow	"	
nigra	"	"	bright red-brown,	"	
amygdaloidea	"	"	glabrous or pubescent	"	
incana	shrubby	slender, dense, very flexible	dark orange or red-brown, lustrous	dark brown, gibbous, broad- ovoid, ridged, lustrous	
caprea	ascending	more stout, flexible	quite red	red, appressed, gibbous	
discolor	spreading	slender, flexible	green, tinged red	very large, ovoid, stout, scale reddish	
pentandra	tree	"	brown	large but long and slender, metallic black tinged red	
lucida	shrub or tree not so tall as S.pentandra	"	brownish-green, lust- rous, viscid in youth polished green or yellow-brown	small, after the leaves large, with the leaves	

SALIX -- Winter Key

Sassafras varifolium is recognized thus

SUMMER : leaves alternate, simple or 1-3 lobed, entire, 3-veined at the base, distinctively flavored and mucilaginous; branchlets and buds glabrous green and glaucous; flowers dioecious, pale yellow; fruit an ovoid blue drupe on a fleshy carmine pedicel.

WINTER : trees with orange bark and green twigs, freely suckering; aromatic; twigs moderate, with nodes shortened near the tips; pith slightly angled, continuous; leaf scars small, $\frac{1}{2}$ -round or crescent shaped, somewhat raised, with a linear bundle trace which may be broken into 3 and without stipule scars; buds solitary, sessile, ovoid, with about 4 fleshy scales; the end-bud enlarged.

SOPHORA JAPONICA is recognized thus

SUMMER : Leaves alternate, pinnately compound, with 7-17 leaflets, petiolate, with small stipules; leaflets opposite, small, ovate, acute, glaucous beneath, slightly stalked; flowers yellowish, pealike, in panicles; fruit an indehiscent pod, terete but constricted between the several seeds; young branchlets green.

WINTER : usually trees; twigs moderate, swollen at the nodes with long internodes, zigzag, angled, green and glabrous; pith triangular, greenish; leaf scars alternate, raised, with an articular membrane which when torn leaves the scars U-shaped, with 3 bundle traces and with stipule scars; buds superposed, sessile, indistinctly scaly, woolly, at first concealed by a membrane; the end-bud lacking; odor strong and offensive when cut or bruised.

The Genus **SORBUS** is recognized thus

SUMMER : Leaves alternate, stipulate, pinnately compound or pinnatifid, serrate; flowers small, white, in terminal, compound corymbs, white, floral parts in 5's; fruit a small red pome clustered near the tip, $\frac{1}{2}$ -round, little raised, with a continuous pith; leaf scars alternate, buds solitary, sessile; lateral buds mostly suppressed, terminal bud rather large, long-ovoid, with about 4 pointed scales.

Summer Key

species	leaves	leaflets	leaflet tip	fruit
<i>quercifolia</i>	pinnately cleft			
<i>americana</i>	pinnately compound	11-17, lanceolate	long acuminate	orange-red
<i>aucuparia</i>	"	7-15, oval to ovate-lanceolate	acute	darker, deep red

Winter Key

species	buds	bundle traces	
<i>americana</i>	elongated, gummy	five	
<i>aucuparia</i>	elongated, woolly	five	
<i>quercifolia</i>	elongated, woolly	three	

SORBUS -- Winter Key

SOPHORA --- **SORBUS**

The Genus **TILIA** is recognized thus
 SUMMER : leaves alternate, simple, 2-ranked, slender long-petioled, broadly ovate, oblique at the base, serrate; flowers in drooping cymes from the midrib of a long and narrow leaf-like bract, creamy-white and very fragrant, the source of the finest honey; fruit globose, nut-like.

Summer Key

species	flowers	leaves	habit	veins	leaf surface	twigs	buds
americana	with staminodes	essentially glabrous, glossy beneath			glabrous, greenish, tinged red	glabrous, stout dark red	
heterophylla	"	dense tomentose beneath, often brown			glabrous, moderate, deep red	glabrous, moderate, red	
tomentosa	"	white tomentose beneath	erect		tomentulose	tomentulose	
peltiolaris	"	"	pendulous		"	"	"
cordata	without staminodes	glaucous beneath, small		with axillary hairs, triple veins	glabrous, slender	glabrous, small	
euchlora	"	glaucous with tufts of hair beneath		not pronounced	glossy	glossy	glabrous
europaea	"	glaucous, glaucous with tufts of hair beneath medium size			dull	glabrous, numerous slender	glabrous
platyphyllos	"	pubescent beneath				loosely hairy	loosely hairy

Tilia cordata and *Tilia europaea* have conspicuous axillary tufts of hairs at the base of the blade on the under side.

The Genus *TILIA* is recognized thus

WINTER; twigs moderate, zigzag, rounded, with rather long internodes; leaf scars alternate, 2-ranked, half-elliptical, a little elevated, with 3 bundle traces which are usually compound, and with unequal stipule scars; buds solitary, sessile, rather largish, lop-sided, ovoid, with 2-3 greenish or red lustrous scales; the end-bud lacking.

Winter Key

species	twigs	hairiness	habit	shell of fruit	branchlets	twig color	bark
<i>platyphyllos</i>	hairy	loose, sparse! densely tomentulose	erect " drooping	5-angled 5-furrowed			gray streaked black
<i>tomentosa</i>	"						
<i>petiolaris</i>	"						
<i>cordata</i>	glabrous	----		thin, fragile	slender, very twiggy		
<i>europea</i>	"	----		thick	subglobose slender less twiggy		almost black
<i>euchlora</i>	"	----		"	ellipsoidal " " "		
<i>heterophylla</i>	"	----		"	moderate " " "	blood-red	
<i>americana</i>	"	----		"	stout oblong- ovoid	reddish on the upper side	

N.B. *Tilia platyphyllos* is included in this key for the sake of distinction but further discussion of it is omitted since it seems less desirable than the others for landscape use. It is occasionally sold as *T.europaea* (*vulgaris*). In its youth it appears very fine, better than *europaea*, dense and shapely. It leafs out early and flourishingly, but in later growth and habit it has many disadvantages such as frost-cracking and sooty deposit plus a serious summer infestation of red spider which quickly yellows the foliage and causes it to drop. For that reason it is better to avoid planting this species. *T.euchlora* is rapid in growth and hardy, but it appears to suffer in much the same way as *platyphyllos*; so again we include it in the key only for the sake of identification, but omit much data.

URTICACEAE

1. Fruit a one-seeded samara, winged, in clusters; bark with flattened ridges; leaves usually doubly serrate, with base oblique; winter buds spreading with scales in 2 ranks. *Ulmus*
2. Fruit a short-stalked drupe; branches never spiny; bark smoothish, scaly; leaves singly serrate, with base symmetrical, subcordate; winter buds spreading with scales in 4 ranks. *Zelkova*
3. Fruit an oblong, berrylike drupe with a sweetish, date-like flavor; bark light gray with deep, corky ridges; winter buds appressed *Celtis*

The Genus *ULMUS* is recognized thus
 SUMMER : leaves 2-ranked, alternate, simple, thickish, dark green, usually doubly serrate, oblique at the base; twigs slender, zigzag, 2-ranked; leaf scars raised very little, broadly crescent shaped, with 3 bundle traces and unequal stipule scars.

species	leaves	fruit	flowers	bark of branches	twigs	buds	leaf margin
<i>racemosa</i>	essentially smooth smooth both sides	hairy all over racemes	in pendulous racemes	often corky	pubescent	large, pilose	doubly serrate
<i>glabra</i>	"	glabrous	dense clusters	not corky, smooth	hispid- pubescent	large, hairy, 4 scales	"
<i>carpini- folia</i>	as above & lustrous	glabrous	"	"	glabrous	large, minutely pubescent	"
<i>americana</i>	rough above, soft pubes- cent below	hairy around edge	on long slender pedicels, pendulous	rough	glabrous	small, glabrous	"
<i>fulva</i>	scabrous both sides	hairy only over seed	short pedicelled, in dense clusters	rough, occasionally corky	rough hairy	large, rusty tomentose	"
<i>procera</i>	rough both sides	glabrous	short pedicelled in dense clusters,	rough, occasionally corky	glabrescent	large, pubescent	"
<i>pumila</i>	glabrous,	glabrous, obliquely ovovate	very short stalked	smooth	slightly pubescent, slender	tiny, hairy — with 4 scales	singly serrate

The Genus *ULMUS* is recognized thus

WINTER: twigs slender, terete, zigzag, 2-ranked in one plane; pith small, rounded, continuous; buds solitary, 2-ranked, ovoid, obliquely sessile; bud-scales obtuse; leaf scars scarcely raised, broadly crescent-shaped, with 3 bundle traces and unequal stipule scars.

N.B. usually the twig in winter and the leaf in summer are sufficient identification.

Winter Key

species	inner bark	buds	bark structure	twigs	branchlets	bud size	bud scales	roots
<i>fulva</i>	mucilaginous	brown tomentose	red all through	scabrous				
<i>americana</i>	not mucilaginous	pale pubes- cent or glabrous	with white layers	Glabrous				
<i>racemosa</i>	"	large, pilose	uniform all through	corky, pubescent				
<i>carpinifolia</i>	"	large, more or less hairy	"	not corky glabrous				
<i>pumila</i>	"	very small, scales ciliate	"	"	slightly pubescent	tiny, oblique	four visible	
<i>glabra</i>	"	large, blackish- red	"	"	hairy while young	large	four visible	not suckering
<i>procera</i>	"	"	"	"	pubescent, occasionally with corky wings	large	four or more	sucker- ing

KEY TO THE SHRUBS IN WINTER

- A. leaf scars whorled (three at a node) or opposite.
 Pith small, angular; buds in depressed pockets, indistinctly scaly; stipule scars evident Cephalanthus
 Pith large, roundish; buds not in depressed pockets and with distinct scales; without stipule scars Hydrangea
 Pith brown, excavated Deutzia

AA. Leaf scars opposite (two at a node).
 Branchlets and twigs densely clothed with silvery or brown scales. Shepherdia
 Branchlets and twigs not clothed with scales.

Twigs spinescent Rhamnus
 Twigs not spinescent.
 Branchlets enlarged at the nodes and flattened; buds superposed in a single-budlike aggregate; leaf-scar horseshoe shaped; parts aromatic when bruised Calycanthus
 Nodes not especially enlarged nor flattened.
 Buds naked or with a single scale or a sac of two closely united scales, short, fat, and gummy within Viburnum
 Buds with several scales.
 b. Buds stalked.
 Lateral buds often concealed by a persistent petiole base; buds oblong and stalked; leaf scars connected by a concave line Cornus
 Lateral buds evident though small; leaf scars meeting or almost so, though not connected Viburnum
 bb. buds sessile.
 c. outer bark freely peeling.
 Twigs and buds densely rusty-tomentose Hydrangea
 Twigs and buds not rusty-tomentose.
 Young growth orange-colored; buds concealed under a membrane Philadelphus
 Not orange-colored and buds not concealed.
 Buds sometimes superposed.
 Leaf scars on the tips of raised bases Lonicera
 Leaf scars not or slightly raised Viburnum
 Buds not superposed.
 Twigs very hairy; buds gray-velvety Kolkwitzia
 Twigs and buds glabrous or glabrescent.
 Pith spongy or excavated Deutzia
 Pith continuous Viburnum
 cc. outer bark firm
 d. leaf scars with three bundle traces.
 e. scars large and broad.
 Twigs stout, terete; buds solitary; end-bud enlarged Aesculus
 Twigs angled and with a very large, soft pith; scars sometimes with 5-7 bundle traces; buds multiple Sambucus
 ee. scars moderate or small.
 Leaf scars hairy at the top Rhodotypos
 Leaf scars not hairy at the top.
 Twigs with 2-4 hairy, raised lines Weigela
 Twigs without hairy, raised lines.
 f. Twigs green.
 Twigs bright green; buds silvery
 silky-hairy Laburnum
 Twigs olive-green, lustrous; buds
 glabrous, with few scales; end-bud lacking; fruit an inflated bladderlike pod Staphylea
 ff. Twigs not green.
 Twigs relatively coarse, with a large pith Hydrangea

- Twigs and pith moderate.
 Leaf scars frequently alternate, half-
 elliptical or crescent-shaped Rhamnus
 Leaf scars always opposite.
 Buds more or less appressed Viburnum
 Buds not appressed.
 Leaf scars on the narrowed ends of
 raised bases; buds at a very broad
 angle with the twig Lonicera
 Leaf scars only slightly raised; angle
 of bud acute Deutzia
 dd. Leaf scars with only one bundle trace, or with many
 traces scattered or in an ellipse or nearly confluent
 in a line (includes cases where the traces are indis-
 tinguishable in a shrivelled scar)
 g. soft, pithy half-shrubs with superposed buds.
 Scars triangular or crescent-shaped Buddleia
 Scars and bundle-traces C-shaped Callicarpa
 gg. not as above.
 h. Pith finally chambered or excavated.
 Twigs distinctly ridged or winged Euonymus
 Twigs not distinctly ridged or winged.
 Buds slender, moderate, finally multiple;
 twigs yellow-buff Forsythia
 Buds small.
 Leaf scars small, ragged, raised, and
 shrivelled Symphoricarpos
 Leaf scars moderate, distinct, low and
 diamond-shaped; twigs angled below the
 nodes Hypericum
 hh. Pith continuous and persistent.
 Twigs angular or grooved below the nodes.
 i. leaf scars relatively broad.
 Buds superposed, scales stiff-pointed.
 Chionanthus
 Buds not superposed, scales not stiff-
 pointed Syringa
 ii. Leaf scars small or minute, elevated.
 scars shrivelled Symphoricarpos
 Twigs terete; scars small, elevated, distinctly
 outlined and without stipule scars . Ligustrum

AAA. Leaf scars alternate (one at a node)

- j. stems with twig spines.
 k. densely clothed with silvery or brown scales.
 End-bud often present, twigs moderate; buds with about four
 exposed scales; thorns lateral Elaeagnus
 End-bud lacking; twigs slender, ending in spines; buds
 with two exposed scales Hippophae
 kk. Not clothed with scales.
 Twigs puberulent, green or brownish; buds solitary . . . Ceanothus
 Twigs glabrous; buds small.
 Twigs whitish or short striate, 5-angled; buds inconspic-
 uously multiple; habit scrambling Lycium
 Twigs orange or reddish, rigid; buds becoming conspicuously
 multiple; twig spines axillary Cydonia
 jj. stems with prickles (superficial outgrowths)
 l. Prickles below the nodes or scars.
 m. Twigs grooved or furrowed.
 With branched or slender leaf-spines and fascicled leaves
 or scars Berberis
 Buds developing a green grooved spine and stipules . . Genista
 mm. Twigs not grooved or furrowed.
 n. Twigs with 1-3 prickles below each narrow leaf scar.
 Twigs light-colored, moderate; bundle-traces 5; buds
 sessile with about 3 exposed scales . . . Acanthopanax
 Twigs darker; bundle traces 3; buds with several
 loose scales Ribes

- nn. Twigs with numerous stout, curved thorns below the nodes;
 twigs very coarse Aralia

11. Prickles scattered (not all at the nodes).
 Young twigs angular or ridged, and with paired stipular
 thorns Robinia

Twigs terete; prickles slender or recurved Rosa

111. Prickles beside the bud (stipules)
 Twigs and buds pungently aromatic; buds rusty-red . . . Zanthoxylum
 Not pungently aromatic (or at least only the stipules so).
 Paired prickles becoming coarse and strong; twigs strongly
 ridged near the tip and colored orange and green; buds
 superposed beneath a membrane Robinia

Paired prickles small, remaining weaker.
 Twigs green, with 3 decurrent ridges beneath the leaf-scars
 Caragana

Twigs not green nor with decurrent ridges; leaf scars torn
 and shrivelled on much raised petiole bases; leaf bases
 not overlapping Rubus

JJJ. Without prickles or spines (unarmed).
 Densely clothed with silvery or brown scales; buds with 4 exposed
 scales Elaeagnus

Not as above.
 Twigs terete, fluted near the tip and terminating in a dilated
 flattened tip with several bud and fruit scars Hibiscus
 Twigs not fluted near the tip nor terminating in fruit scars.
 k'. Buds naked.
 Fruit a 2-celled woody capsule Hamamelis
 Fruit a small drupe Rhamnus

kk'. Buds not naked.
 Stems brownish-yellow overcast with a leaden color near
 the tips; buds a little elongated, pointed, and loose.
 Clethra

Stems not as above.

o. Stems and buds spicily and pungently aromatic.
 Buds rather small, superposed, the upper flower-
 buds collaterally doubled and stalked Benzoin

Buds not superposed nor multiple.
 p. Young twigs resinous-dotted.
 With stipule scars Comptonia
 (see Myrica key)

Without stipule scars Myrica

pp. Young twigs not resinous-dotted; coarse
 or else hairy or glaucous Rhus

oo. Not aromatic.

q. Twigs, stems, and branches green.
 With a narrow scar completely encircling the
 twig at each node Magnolia
 Without such scar.
 r. stems definitely and positively ridged.
 Buds small, encased in hardened greenish
 resin; ridges about eight Baccharis

Buds not resinous; branches smooth.
 Scars with 3 bundle traces; pith rela-
 tively large Kerria

Scars with one indistinct bundle trace;
 pith small.
 Some buds producing a green,
 grooved spine Genista

Buds not becoming spines Cytisus

rr. Stems not positively ridged.
 Buds with a single scale opening on the
 inside next the twig Salix

Buds with more than one scale, more or
 less stalked Cornus

qq. Twigs and stems not green
 s. bark freely peeling.
 Twigs roughened by lenticels and longitudinal
 fissures; bundle traces 3; inner bark
 reddish Exochorda

Twigs not roughened as above.

Bundle traces 5; inner bark bright orange.

Physocarpus

Bundle traces 3; buds stalked; leaf scars narrow;
pith spongy *Ribes*

ss. Not freely peeling.

Twigs enlarged upwards through the season's
growth; leaf scars scalloped and almost
encircling the bud

Twigs not enlarged upwards. *Dirca*

t. Buds red, elongated; twigs grayish.

Bud scales more or less twisted . . .

Amelanchier

tt. Buds not red.

Bud scales keeled and mucronate . . . *Photinia*
(sometimes tinged red)

Bud scales not keeled nor mucronate.

Leaf scars essentially lacking; buds

multiple; twigs fine and very dark.

Tamarix

Ordinary leaf scars present.

u. Bundle traces one.

Buds superposed.

Leaf scars much raised, with one
or 3 bundle traces and with per-
sistent stipules; fruit an
inflated pod *Colutea*

Leaf scars more or less raised,
with 1 bundle trace and with
minute stipule scars; fruit
a persistent, berrylike drupe. *Ilex*

Buds solitary or occasionally
collaterally multiple.

v. Bud scales two.

Scales ciliate; no stipule
scars *Nemopanthus*
Not ciliate, usually parted
and exposing the hairy
interior; stipule rather
persistent, leaving narrow
indistinct scars . . . *Cotoneaster*

vv. Bud scales more than two.

Buds globose to spindle-shaped
(thickest at the middle) and
with about 6 exposed scales.

Spiraea

Buds ovoid and with fewer scales.
End-bud present, root deep red;
bud scales indistinct,

glabrate, stipular; stipule
scars small *Ceanothus*

End-bud lacking or deciduous.

Seeds solitary in each fruit-
cell; young branches with

resinous dots . . . *Gaylussacia*

Seeds several in each cell;
young branches not resinous.

Vaccinium

uu. Bundle traces 3 or more.

Buds at first under a membrane, closely
superposed in pairs, silky-hairy;
scar finally U-shaped *Ptelea*

Buds never concealed by a membrane.

Twigs more or less 3-sided; buds
rather large, usually stalked, and

with 3 sub-valvate scales . . . *Alnus*

Twigs and buds not as above.

w. Buds superposed.

Stipule scars relatively large;
pith pale or light brown.

Stephenandra.

Stipule scars small; pith white.

Amorpha

ww. Buds solitary or collaterally
multiple.

Leaf scars relatively large; buds
with about 4 exposed scales.

Sorbaria

Leaf scars relatively small; buds
with fewer or more scales.

x. Leaf scars 2-ranked.

Twigs slender; buds with
2-3 exposed scales ..

Betula

Twigs moderate; buds with
4-6 exposed scales ..

Corylus

xx. Leaf scars not 2-ranked.

Buds clustered near the tip
and with numerous 5-ranked
scales; bundle traces
numerous Quercus

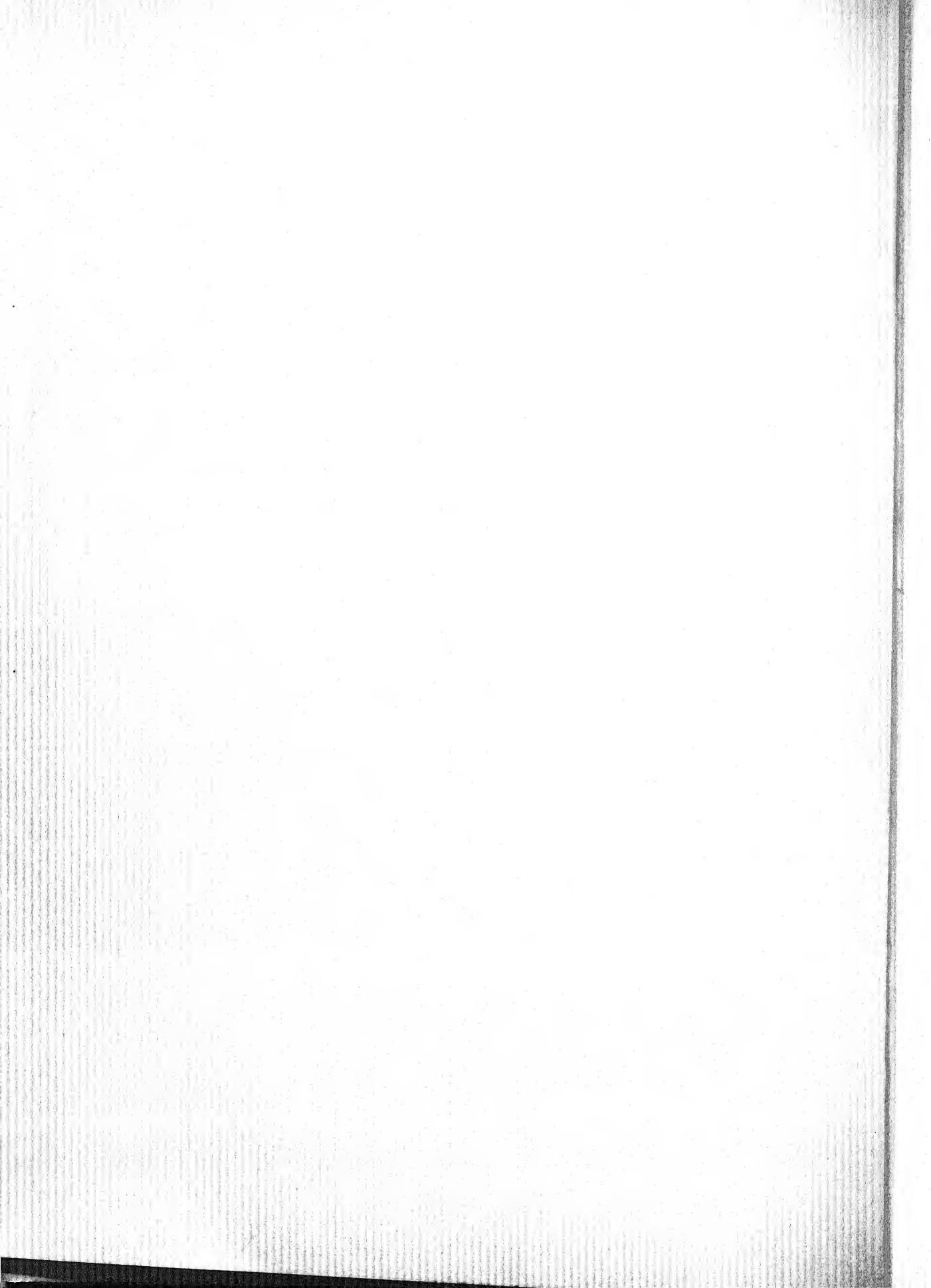
Buds not a above.

Bundle traces 3, minute

Prunus

Bundle traces 3, large

Xanthoceras



KEY TO THE DECIDUOUS SHRUBS WHEN IN FOLIAGE

- A. Leaves opposite or whorled
Branches and under side of leaves densely clothed with silvery or brown scales Shepherdia
Not clothed with silvery or brown scales
- B. Leaves compound
Leaves palmate
with 3 leaflets; flowers yellow, in drooping racemes; twigs green Laburnum
with 5-7 leaflets; flowers in large, erect clusters; fruit a 3-valved pod Aesculus
- Leaves pinnate
with 3 leaflets
leaves all compound; flowers in racemes after the leaves Staphylea
leaves chiefly simple; flowers yellow, not in racemes, before or with the leaves Forsythia
with 5-9 leaflets; pith large Sambucus
- BB. Leaves simple
- C. Leaf margin entire, neither toothed nor lobed
leaves more or less punctate with pellucid dots; flowers bright yellow in summer; floral parts in 5's; fruit a dry, dehiscent capsule Hypericum
leaves not punctate; flowers not yellow; fruit not dehiscent.
twigs ending in a short spine between the upper-most buds Rhamnus
twigs not spinescent
- D. Petioles short
Nodes of stem flattened, parts aromatic when bruised Calycanthus
Nodes not flattened, parts not aromatic
Leaves glabrous, glaucous below, often lobed on vigorous shoots; flowers small, pinkish bells Symphoricarpos
not as above; leaves more or less hairy or glabrous, not glaucous nor lobed
Leaves firm and lustrous; branches greenish; fruit a drupe in panicles Ligustrum
Leaves soft and dull, bluish or hairy; branches brown; fruit a berry in axillary pairs
- DD. Petioles medium or long
leaves with stipules, often 3 at a node; flowers and fruits in dense globular heads Cephalanthus
Without stipules; flowers and fruits not in globular heads
Twigs squarish, especially at the nodes, gray; buds with stiff, keeled scales Chionanthus
Twigs terete
Twigs slender and bright-colored; buds small or slender; terminal bud present; leaves with anastomosing veins, more or less pubescent Cornus
Twigs less slender, tan-colored; end-buds usually lacking; leaves glabrous or glaucous or whitened beneath or finely dotted; flowers tubular in terminal pyramidal panicles Syringa
- CC. Leaf margin toothed or lobed
Twigs with 2-4 hairy, raised lines; fruit a 2-valved capsule Weigela

Twigs not as above

Twigs yellowish or greenish, ridged, pithy, glabrous; leaves lanceolate to ovate, slightly fleshy *Forsythia*

Twigs not as above

e. leaves distinctly lobed

Twigs densely brown tomentose near the tip *Hydrangea*

Twigs not brown tomentose

Fruit a winged samara; leaves regularly palmately lobed; buds with several overlapping scales *Acer*

Fruit a drupe; buds naked or with two scales which meet but do not overlap *Viburnum*

leaves very short-stalked; flowers and fruits in axillary cymes *Callicarpa*

Leaf petioles short or moderate; flowers and fruits not in axillary cymes

f. twigs green, angled or ridged

Soft, pithy, half shrubs; flowers lavender in terminal clusters *Buddleia*

Not as above; flowers in stalked, axillary clusters *Euonymus*

ff. Twigs not green

Twigs ridged or winged *Euonymus*

Twigs not ridged or winged

Twigs very hairy, gray *Kolkwitzia*

Twigs not so hairy, brown

Leaf scars ciliate; flowers solitary; fruit a black drupe in terminal clusters of four *Rhodotypos*

Not as above

g. all flowers fertile

Branchlets hollow; bark dark brown; peeling; flower clusters axillary; flowers with 5 petals; fruit indehiscent *Deutzia*

With solid white pith; bark orange to orange-brown

Flowers and fruit sub-paniculate, terminal; flowers with 4 petals; fruit dehiscent in 4 valves; leaves 3-5 nerved at the base, remotely toothed; veins impressed . . . *Philadelphus*

Flowers of 2 kinds - fertile and sterile; leaves serrate

Leaves serrate; fruit a capsule; flowers & fruits in terminal corymbs *Hydrangea*

Leaves dentate; fruit a drupe; flowers and fruits in cymes . . . *Viburnum*

AA. Leaves alternate

Leaves minute and scale-like *Tamarix*

Leaves not minute nor scale-like

h. Leaves compound

Leaves palmate

Leaves 5-parted, armed

Leaves 3-parted, not armed *Acanthopanax*

Leaves pinnate

i. Plant aromatic when bruised

without spines or prickles *Rhus*

with spines or prickles

young leaves glandular, sweetly fragrant and stipulate; prickles strong, hooked, mixed with bristles

All parts pungently aromatic; leaves pellucid-dotted; estipulate; prickles in pairs at the nodes *Rosa*

Zanthoxylum

ERRATUM

Page 46. Insert between lines 11 and 12: "The leaves not lobed."

- ii. Not pungently aromatic

j. with thorns or prickles

 - branchlets very coarse and with a large pith, armed with very broad, stout prickles; leaves doubly compound, estipulate, prickly on the upper side *Aralia*
 - branchlets moderate; pith moderate or small; leaves singly compound and with stipules
 - Leaves without a terminal leaflet; leaflets obtuse at the tip; stipules often persisting as slender prickles *Caragana*
 - Leaves with a terminal leaflet, acute at the tip
 - Prickles stipular, paired at the nodes . . . *Robinia*
 - Prickles numerous, not limited to the nodes.
 - Twigs angular, short-lived; leaves toothed and petioled; pistils borne on a convex receptacle *Rubus*
 - Twigs terete, normal; leaves with dilated stipule-bearing petioles; pistils enclosed in an urn-shaped receptacle . . . *Rosa*

JJ. without thorns or prickles, leaflets more than three

Margin toothed

 - Flowers small in panicles; fruit a follicle . . *Sorbaria*
 - Flowers moderate in racemes; petals clawed; fruit a 3-valved capsule with thick walls . *Xanthoceras*

Margin entire

 - Bark fibrous or flaky; flowers in axillary racemes; fruits inflated, with papery walls; leaves not glandular *Colutea*
 - Bark not fibrous nor flaky; flowers in terminal spikes; fruits tiny, glandular, bean-like pods; leaves punctured with glands . . . *Amorpha*

hh. leaves simple

k. leaves lobed

 - l. petioles with stipules
 - Leaves and buds 2-ranked; twigs slender, zigzag; flowers small, white *Stephanandra*
 - Not 2-ranked; twigs coarse, bark peeling; flowers large, pink *Rubus*

ll. Petioles without stipules

 - Bark freely peeling; leaf 3-lobed . . . *Physocarpus*
 - Bark firm
 - Twigs terminated with numerous, flat, round flower and fruit scars; habit erect; leaves wedge-shaped at base, lobing poorly defined, only the upper half toothed *Hibiscus*
 - Twigs not so terminated with scars; habit arching or tangled
 - Leaves slightly 3-5 lobed, dark green above, pale beneath, not glandular *Spirea*
 - Leaves distinctly palmately lobed, bright green both sides, glandular beneath *Ribes*

kk. Leaves toothed but not lobed

m. Having thorns or prickles

 - Leaves clustered on short spurs *Berberis*
 - Leaves not clustered on spurs
 - Thorns terminal *Rhamnus*
 - Thorns lateral; leaves with large stipules, thick and glossy *Cydonia*

mm. Without thorns or prickles.

n. Flowers and fruits in catkins.

 - Bark in papery layers with long transverse lenticels; fruit a minute nut with membranous wings *Betula*
 - Bark not as above

- buds covered by a single scale, twigs very flexible *Salix*
 buds with more than one scale, twigs less flexible.
 Fruit a nut enclosed by a leafy involucre . *Corylus*
 Fruit not in an involucre, but forming cones . . *Alnus*
- nn. flowers and fruits not in catkins.
- o. Plant aromatic when bruised.
- Leaves very narrow and long, - pinnatifid,
 fernlike (See species for *Myrica*) . . . *Comptonia*
 Leaves short, toothed near the tip or entire,
 fruits covered with a whitish resin . . *Myrica*
- oo. Plant not especially aromatic.
- p. twigs green, angular.
- Leaves narrow-ovate, thin, sharply
 toothed, flowers yellow *Kerria*
 Leaves obovate, somewhat thick, palmate or
 3-nerved; fruit with a conspicuous
 white pappus *Baccharis*
- pp. Twigs not typically green (or at least tinged red).
- Leaves with resinous dots beneath . . *Gaylussacia*
 Leaves not resinous-dotted.
- Leaves typically with 3 main veins; root-
 stalk red, very large *Ceanothus*
 Leaves with only one main vein; root-stalk
 not red.
- Petioles of leaves usually glandular . . *Prunus*
 Not glandular
 Leaves mucronate at the tip; margin
 obscurely serrate; fruit on long pedicels.
- Not as above
 Leaves glaucous, toothed near tip;
 fruit 5-lobed; bark reddish *Nemopanthus*
- Not as above
 Fruit an acorn; leaves oblong, without
 stipules, obscurely toothed, gray-
 tomentulose beneath *Quercus*
- Not as above
- q. Fruit a berry, drupe, or pome
- r. Flowers in racemes
 Racemes drooping, axillary;
 leaves oval to obovate
 Amelanchier
- rr. flowers not in racemes
 Flowers solitary in the leaf
 axils; fruit a drupe; leaves
 singly serrate, with slightly
 impressed veins, pith
 green *Ilex*
 Flowers not solitary, in
 short corymbs or cymes.
 Fruit hollow & open at
 top; a tall shrub or
 small tree *Photinia*
 Fruit closed & pointed at top.
 Leaves with small black
 glands along the midrib
 Aronia
 Without such glands *Rhamnus*
- qq. Fruit a capsule or follicle.
- Flowers in umbel-like racemes,
 corymbs or panicles, glabrous
 or pubescent; fruit of five
 follicles *Spiraea*
 Flowers in terminal, slender, erect
 racemes or spikes, pubescence
 stellate, capsule splitting
 into 3 valves *Clethra*

- kkk. leaf margin entire
- s. leaves and twigs clothed with silvery or brown scales.
 - Twigs with terminal thorns; leaves very slender; fruit bright orange; twigs with brown scales near the tip Hippophae
 - Twigs with lateral spines or none; leaves less slender; fruit dry, yellow to pink; twigs with brown scales Elaeagnus
 - ss. not clothed with silvery or brown scales
 - t. having thorns or prickles
 - Leaves in fascicles on short axillary spurs; habit shrubby; leaves rather small, oval and short-petioled Berberis
 - Leaves often fascicled, slender, but not on spurs, and with long stipules; twigs yellowish; habit scrambling; leaves moderately small, lanceolate, cuneate, subsessile Lycium
 - tt. without thorns or prickles
 - Twigs enlarged upwards through the season's growth; leaf petioles enclosing and concealing the bud Dirca
 - Twigs not thus enlarged; buds evident.
 - u. parts aromatic when bruised
 - Leaves large, oblong, bright green; twigs lustrous Benzoin
 - Leaves moderate, oval, glaucous; twigs glaucous Cotinus (see Rhus)
 - uu. not especially aromatic
 - Leaves rather large, lop-sided, and with a sinuate margin Hamamelis
 - Leaves symmetrical
 - v. buds enclosed by a single scale
 - Buds large, bearing a petiole-scar above the base; twigs encircled by a narrow scar at the nodes . Magnolia
 - Buds small or moderate, appressed; petiole scar below the base of the bud; twigs very flexible, not encircled by a scar at the nodes . Salix
 - vv. buds with several scales
 - w. branchlets green, striped; leaves small, often ternate
 - Branches spineless; seeds with a callus appendage Cytisus
 - Branches often spiny; seeds with out callous appendage . Genista
 - ww. Branchlets not green or at least tinged red
 - Leaves with awl-shaped stipules, ovate to oval, lustrous dark green . Cotoneaster
 - Leaves without such stipules.
 - Leaves resinous-dotted; fruit berry-like, with ten 1-seeded nutlets Gaylussacia
 - Leaves not resinous-dotted.
 - Fruit a many-seeded berry . Vaccinium
 - Fruit a leathery or fleshy 1-seeded drupe; flowers before the leaves on old wood . Daphne

AGANTHOPanax Sieboldianus may be recognized thus

SUMMER : a shrub, sparingly branched and prickly; leaves alternate, partly fascicled on short spurs, slender petiolated, estipulate, palmately divided with 5-7 leaflets, the latter obovate to oblong-obovate, glabrous, acute, cuneate; flowers greenish-white, in terminal umbels; fruit a 2-5 seeded black berry, seldom seen under cultivation.

WINTER : branches moderate, yellowish, somewhat lenticular, armed with 1-3 prickles beneath each leaf scar, often with short spurs or spur-like branchlets; leaf scars alternate, narrow, crescent- or U-shaped, slightly raised, with 5 small bundle traces and no stipule scars; buds alternate, solitary, sessile, conical-ovoid, with about 3 thin scales evident.

The Genus **AMORpha** may be distinguished thus

SUMMER : leaves alternate, pinnately compound, marked with minute dots; leaflets small, entire, with soon falling, awl-shaped stipules; flowers purple or blue, pealike, in terminal spikes, erect, on the calyx usually gland-dotted; fruit a small pod, indehiscent, oblong, very glandular, curved on the back.

WINTER : shrub with slender, yellow-gray twigs, very slightly angled; pith white, continuous; leaf scars alternate, slightly curved, low, triangular, with 3 bundle traces and with small stipule scars at the outer corners; buds small, superposed, nearly globose, projecting at a narrow angle from the twig, with 2-3 exposed scales.

Summer Key

species	habit	leaflets	pubescence	calyx	flowers	fruit
fruticosa	tall shrub	lowest pair $\frac{1}{3}$ " or more from stem	sparse	lower lobes acute	purple	curved
canescens	low shrub	lowest pair close to stem	dense & whitish	lobes $\frac{1}{2}$ as long as tube	blue	—
					lead-gray	—

species	buds	twigs	stipule scars	leaflets	color
fruticosa	superposed	glabrate	evident	moderate, scattered	blue-green
canescens	solitary	white-woolly	minute	small, crowded	lead-gray

ARALIA SPINOSA is recognized thus

SUMMER : branchlets very thick with stout cortical prickles; leaves alternate, petiolate, pinnately to thrice pinnately compound, estipulate; leaflets distinctly stalked, with the veins curving before reaching the margin; base of the petiole clasping the stem to $\frac{1}{2}$ or more; flowers small, whitish, in large pubescent panicles; fruit small, black, a drupe with 2-5 flattened stones, less persistent than the red-violet pedicels.

WINTER : large shrub or small tree, much suckering, with numerous strong prickles; twigs thick, terete, with a large pith, glabrous; leaf scars alternate, U-shaped, low, $\frac{1}{2}$ -encircling the twig, with 5 bundle traces and no stipule scars; buds ovoid-conical, solitary, sessile, with few scales, comparatively small.

AGANTHOPanax

— **AMORpha** — **ARALIA**

The Genus ARONIA may be distinguished thus

SUMMER : leaves elliptic or oblong to obovate, with minute black dots or glands along the midrib on the upper side; flowers white or marked pink, in small corymbs, with reddish anthers; fruit a small pome with persistent calyx lobes.

WINTER : twigs brown, glabrous, or pubescent, moderate, terete; leaf scars alternate, low, U-shaped, with 3 bundle traces and no stipule scars; buds solitary, sessile, appressed, usually red and elongated-oblong, with about 5 pointed and somewhat glandular-denticulate scales.

Summer Key

species	under side of leaves	branchlets	fruit
arbutifolia	pubescent	tomentose glabrous	red black
melanocarpa	glabrous or nearly so	glabrous	—

species	twigs and buds	under side of leaves	fruits
arbutifolia	hairy	rather woolly	red
melanocarpa	glabrous or nearly so	glabrous	black

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BACCHARIS HALIMIFOLIA is recognized thus

SUMMER : an unarmed shrub; leaves alternate, moderate sized, simple, toothed but not lobed, petiolate, obovate, thickish, with 3 main veins from the base, cuneate, resinous; flowers and fruits in small heads, these in terminal panicles or corymbs; fruit an achene, ribbed and somewhat compressed, with a white pappus of long, bristly hairs.

WINTER : twigs green, angular or ridged, with a small, continuous pitch, resinous but not aromatic; leaf scars alternate, small, broadly v-shaped, slightly raised, decurrent in ridges from the angles, with 3 bundle traces and no stipule scars; buds small, oval or globose, with about 4 scales, encased in a hardened, greenish resin.

BENZOIN AESTIVALE is recognized thus

SUMMER : shrub with all parts aromatic; leaves alternate, simple, entire, oblong-obovate, with one main vein, acute, cuneate, glabrous, short-petiolated; buds evident, with 2-3 outer, pale-toned scales; flowers pale honey-yellow, fragrant, in subsessile, axillary clusters; fruit an oblong-obovate scarlet drupe.

WINTER : spicily-aromatic when bruised or broken; twigs lustrous olive-green to brownish-green with pale lenticels; leaf scars alternate, small, crescent shaped or half-round, slightly raised, with 3 bundle traces, often confluent, and no stipule scars; buds smallish, superposed, the upper flower buds collaterally doubled and stalked, the leaf buds with about three exposed scales; end-bud lacking.

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ARONIA -- BACCHARIS -- BENZOIN

The Genus **BERBERIS** is recognized in

SUMMER : leaves alternate, often fascicled on short axillary spurs, simple, often entire; inner bark and wood yellow; flowers yellow, axillary; fruit a several-seeded berry.

WINTER : shrubs with spines at the base of very short spurs; wood and inner bark yellow; twigs grooved or furrowed, slender; leaf scars half-round, with $\frac{3}{4}$ minute, often indistinct bundle traces and no stipule scars.

species	habit	flowers and branches	leaves	branchlets	spines
<i>buxifolia</i>	sub-evergreen	solitary	entire		
<i>darwini</i>	"	racemes longer than leaves	dentate, green		present
<i>Mahoberberis neuberti</i>	"	unarmed, glabrous	not fascicled, often pinnately 3-foliolate	glabrous	"
<i>Mahoberberis neuberti</i> <i>Latifolia</i>	"	racemes shorter than leaves	dentate, glau-	unarmed	
<i>mentorensis</i>	"	, glabrous	cous, blue-green	pubescent,	
<i>vulgaris</i>	deciduous	fascicled racemes	not fascicled thicker than B. thunbergii	spiny	unarmed
<i>wilsonae</i>	"	fascicles, 2-6, short-stalked		puberulous	branched
<i>thunbergii</i>	"	fascicles, 2-6, slender stalked	red-green	glabrous	3-parted
N.B. <i>B. sargentiana</i> and <i>B. julianae</i> have glabrous branchlets and are evergreen.		(varieties red)	(varieties red)	"	simple

BUDDLEIA DAVIDI may be recognized thus

SUMMER : semi-woody shrubs; leaves opposite, simple, short-petioled, serrate, glabrous above and white tomentose beneath; flowers violet or red-violet, tubular, with the stamens inserted above the middle of the tube, in long, slender panicles; fruit an oblong, pointed capsule.

WINTER : unarmed shrubs; twigs semi-woody, pithy; glabrous or puberulous, square, green to yellowish bundle trace and with stipule scars transversely connected; buds oblong, sessile, sometimes superposed, with two outer scales.

CALLICARPA AMERICANA is recognized thus
SUMMER : leaves opposite, pubescent above, tomentose beneath, elliptic-ovate, acuminate, cuneate, crenate-serrate, with fairly long petioles; inflorescence subsessile; flowers small, in axillary cymes; fruit a small, violet drupe, subglobose, with 2-4 stones.
WINTER : a soft-wooded shrub; twigs dingy yellowish, round or slightly 4-angled, persistently scurfy with stellate hairs, slender, and with a comparatively large pith; leaf scars opposite or almost so, in 4 ranks, broadly crescent shaped, with one bundle trace and no stipule scars; buds small, often stalked, subglobose, superposed, bud-scales indistinct or almost valvate.

CALYCANthus FLORIDUS is recognized thus

SUMMER : aromatic shrubs; leaves opposite, short-petioled, entire, estipulate, ovate to elliptic, pinnately veined, densely pubescent beneath; flowers brownish-red or deep maroon red with numerous stamens and many narrow petals; fruit an indehiscent capsule, pear-shaped, rather large.
WINTER : shrub, sparingly branched; twigs moderate, villous, flattened at the nodes; leaf scars 2-ranked, opposite, the pairs often separated, horseshoe-shaped, much raised, with 3 bundle traces and no stipule scars; buds superposed, in a single bud-like aggregate, sessile, sometimes almost suppressed or hidden, brown-hairy, naked or appearing so; end-bnd lacking.

CARAGANA ARBORESCENS is recognized thus

SUMMER : an unarmed shrub without particular odor; leaves alternate, pinnately compound, without terminal leaflets; leaflets obtuse, soft hairy; stipules often persisting as slender, soft prickles; flowers fascicled, yellow, pea-like; fruit small, beanlike.
WINTER : branchlets moderate, stiff, greenish, with 3 decurrent ridges below each leaf scar; leaf scars alternate, much raised, very small, $\frac{1}{2}$ -round, with the rachis often persisting as a spine, having one bundle trace and stipules persistent, often pungent; buds small to moderate, solitary, sessile, with 3-4 exposed scales.

COLUTEA ARBORESCENS is recognized thus

SUMMER : branches unarmed, bark fibrous; leaves alternate, pinnately compound, odorless; leaflets small, entire, more than three, with small stipules; flowers yellow in axillary, long-peduncled, few-flowered racemes, pea-like, with the wings about as long as the keel; fruit a glabrescent, inflated pod, indehiscent, with papery walls.
WINTER : twigs moderate, grayish, terete but with decurrent lines from the nodes, appressed pubescent; leaf scars alternate, broadly crescent-shaped, much raised, with 1-3 bundle traces and with the stipules persistent on the sides of the leaf cushion; buds small, globose-ovoid, with 2-4 outer scales, superposed.

CEPHALANTHUS OCCIDENTALIS is recognized thus

- SUMMER : leaves opposite or whorled, simple, entire, with triangular stipules; petioles moderate; flowers white, small, in dense globular heads, axillary; fruit a small achene in dense globular heads, tan-colored.
- WINTER : twigs terete, red-brown with light lenticels, dying back at the tips, glabrous; pith small, angular; leaf scars opposite or whorled (often 3 at a node), roundish, raised, with one bundle trace, and with evident stipule scars or the stipules persisting; buds small, often superposed, conical, indistinctly scaly, in depressed pockets; end-bud lacking.

CEANOHTHUS AMERICANUS is recognized thus

- SUMMER : leaves alternate, simple, moderately large, odorless, ovate to oblong-ovate, acute or acuminate, irregularly serrate, with three main veins from the base, pubescent or nearly glabrous beneath, with small stipules; flowers small, white, in terminal and axillary racemes, or panicles; fruit a capsule, 3-lobed at the apex, finally splitting into 3 dehiscent parts, the cuplike receptacles persisting.
- WINTER : low shrub, unarmed; twigs terete, puberulent, rather slender, brown or greenish-brown; leaf scars alternate, $\frac{1}{2}$ -round, slightly raised, small, with one transverse, evidently compound bundle trace, and with small stipules often persistent; buds solitary, sessile, small ovoid, pubescent, with few outer scales of which only the lower ones are distinct.

CHIONANTHUS VIRGINICA is recognized thus

- SUMMER : leaves opposite, simple, entire, petiolate, oblong, estipulate; inflorescence in racemes or panicles dioecious; flowers white, in drooping panicles, from lateral buds, petals long and narrow; fruit a dark blue drupe, one-seeded.
- WINTER : Bark firm; twigs gray, squarish, especially at the nodes, pubescent while young; pith continuous and persistent; leaf scars opposite, relatively broad, crescent-shaped, raised, not large, with one transverse bundle trace and no stipule scars; buds superposed, sessile, pointed, keeled scales, ovoid, relatively small, with about six stiff, pointed, keeled scales.

CLETHRA ALNIFOLIA is recognized thus

- SUMMER : leaves alternate, toothed but not lobed, pinnately veined, serrate, glabrous, in terminal panicle, short-petiolated; flowers white, very fragrant, subglobose capsule, splitting in 3 valves, persistent.
- WINTER : unarmed shrub; twigs brown, older twigs glaucous near tip, younger twigs scurfy tomentulose, then stellate-pubescent, obscurely triangular; leaf scars alternate, clustered near tip, triangular, low, with one bundle trace and no stipule scars; buds small, loosely scaled, solitary, sessile, ovoid.

*COMPTONIA PEREGRINA** is recognized thus

SUMMER : leaves alternate, simple, petiolate, linear-oblong, deeply pinnatifid, with round-ovate, oblique, mucronulate lobes, pubescent, pungent when bruised; flowers in catkins; fruit an ovoid nutlet, glabrous, subtended by elongated, awl-like bracts.

WINTER : an aromatic shrub; twigs terete or angular, slender, resinous-dotted while young; pith small, green; leaf scars alternate, $\frac{1}{2}$ -elliptical or triangular, more or less raised, with 3 bundle traces and small stipule scars; buds small, solitary, subglobose, sessile, with 2-4 outer scales; end-bud lacking.

COMPTONIA (syn. *Myrica*)

The Genus CORNUS is recognized thus

SUMMER : erect, deciduous, unarmed shrubs; twigs reddish or greenish; leaves opposite except in one species, viz. *alternifolia*, petiolated, entire, with anastomosing veins; flowers in terminal cymes or heads, small, often surrounded by involucral bracts; fruit a small drupe.

species	arrange- ment	under side of leaves	pith	fruit	involucre	flowers	floral pubes- cence	leaves	lateral buds	habit	twig color
<i>alterni- folia</i>	alter- nate	hairs irreg- ularly diverging						cuneate			
<i>amomum</i>	opposite	light green, veins rusty- pubescent	brown	blue, spher- ical			woolly, spreading	only the veins pubes- cent			red- violet
<i>sanguinea</i>	"	light gr., villous	white	black			"				green- ish
<i>mas</i>	"	"	"	reddish-deciduous	dense umbels, with involu- cre	yellow	not woolly, Brous-	very di- vergent			
<i>Florida</i>	"	whitened beneath	"	reddish, iptical, pedicel short	in flow- er-like heads	"	"				
<i>kousa</i>	"	"	"	showy, with emargin- ate bracts	in glo- bose shy head	"	"				
<i>Baileyi</i>	"	"	"	white spher- ical	lacking	cymose	white	woolly			
<i>stolonifera</i>	"	"	"					ovate- lanceo- late, loosely hairy beneath	stalked	brown- ish- red	
<i>alba</i>	"	"	"	ellip- tical, com- pressed	cymes flat	"	"	sessile, glab- rous	sessile, per- ous	red	
<i>racemosa</i>	"	"	white or brownish	white with red stone not com- pressed	cyme pani- culate, convex	"	"	ovate or elliptic, acute, whitish beneath	long- stalk- ed	bright red	
								lanceo- late	erect	grayish	

The Genus **CORNUS** is recognized in WINTER : erect, deciduous, unarmed shrubs with red or green branches; leaf scars opposite, rarely alternate, meeting around the twig, small, narrow, in four ranks, with 3 bundle traces; pith continuous and persistent; winter buds elongated, with 2 valvate scales, axillary buds appressed.

species	arrange- ment	fruit color	twig color	fruits	flower buds	leaf scars	habit	buds and branch- lets	lateral buds	pith
alterni- folia <i>Kousa</i>	alter- nate opposite	bluish, bloomy red	green	united into a globose fleshy head	enlarged, flattened vertically	raised covering buds	stratified	gla- brous	con- cealed	
florida	"	"	"	individual- ly distinct but in dense clusters	"	"	"	soon gla- brous		
mas	"	"	"	"	enlarged, not flat- tened, obovate	not as above	—	—	—	—
racemosa	"	white, on red pedicels	grayish	in loose cymes	not en- larged	"	erect, twiggy	silky- hairy	sub- erect	
amomum	"	blue	purplish- red	"	"	"	ascending spreading	woolly	sub- erect or nearly sessile	brown ish
sanguinea	"	black	green with up- per side deep red	"	"	"	hairy all over	"	sessile or al- most so	white
baileyi	"	bluish- white	red	"	"	"	loose and osierlike	hairy, twigs scarcely glabrous	stalked	"
alba	"	"	"	"	"	"	more erect, loose and osierlike	gla- brous-	"	"
stoloni- fera	"	"	"	"	"	"	stoloni- ferous	long- stalked	"	"
							"	not stalked	"	

The Genus *CORYLUS* is recognized thus

SUMMER : twigs moderate, zigzag, pubescent; flowers alternate, ovate, doubly serrate, more or less pubescent; flowers in catkins; fruit an ovoid nut in a thin, fringed or toothed involucrue.
WINTER : an erect shrub with moderate, zigzag, pubescent twigs; buds alternate, solitary, sessile, set obliquely to the scar, ovoid and obtuse, with several to many exposed scales which are greenish in color with brown edges; end-bud lacking; leaf scars 2-ranked, half-round or triangular, a little raised, with $\frac{3}{2}$ bundle traces and long stipule scars; flower-buds in catkins.

Summer Key

species	branchlets	involucrue	involucral bracts	leaves
avellana	glandular-pubescent	of two bracts	not or only slightly longer than the nut	suborbicular to broad-obovate, often slightly lobulate
americana	"	"	about twice as long as the nut, closed	broad-ovate or oval
cornuta	slightly hairy	tubular	"	ovate to obovate

Winter Key

species	buds	fruit
avellana	small, glabrescent	husk open, hardly longer than the nut
americana	small, gray-pubescent; outer scales persistent	husk closed or longer than the nut, frilled
cornuta	gray-pubescent, outer scales elongated, quickly falling	husk closed or longer than the nut, beaked or tubular

The Genus COTONEASTER is recognized in

SUMMER : erect or sprawling shrubs; leaves simple, usually smallish, entire, short-petioled, alternate, with awl-like stipules; flowers white or pinkish, small and not conspicuous, terminal on short lateral branchlets; fruit a small drupe-like pome or pome-like drupe with persistent, incurving sepals, and 2-5 stones.

WINTER : twigs slender, rounded; leaf-scars alternate, minute, elliptical, raised, with one indistinct bundle trace and persistent stipules; buds solitary, sessile, ovoid or oblong, with the outer scales parted and showing the hairy bud inside.

species	character	habit	leaves	under side	upper side	inflorescence	branches and twigs	flowers	size of leaves	fruit
<i>microphylla</i>	evergreen or sub-evergreen	ovate margin wavy	densely hairy	sparingly round-oval	lustrous			petals spreading		red
<i>horizon-talis</i>	"	round-oval	pubescent					horizontal with up-lying spread-right petals		red
<i>rotundifolia</i>	"	"	nairy when young, soon glabrous	dull			"			"
<i>dammeri</i>	"	elliptic	"	lustrous				trailing with spreading petals		"
<i>adpressa</i>	deciduous	prostrate	margin wavy						one inch or less	"
<i>zabelii</i>	"	erect	apex obtuse	yellow tomentose						"
<i>dielsiana</i>	"	"	mostly acute	mostly obtuse						"
<i>hupehensis</i>	"	"	acute	apex obtuse or acutish	thinly tomentose			many-flowered corymbs	calyx villous	"
<i>divaricata</i>	"	"	obtusish	glabrous or slightly pubescent on the midrib				few flowered cymes	"	"
<i>racemiflora</i>	"	"	sub-orbicular, obtuse	white, tomentose			many flowered corymbs	gray calyx	calyx tomentose	"
<i>interrigima</i>	"	"	obtuse	whitish or grayish					or more pubescent	"
<i>acuminata</i>	"	"	acute	tomentose					large	
<i>foveolata</i>	"	"	mostly acute	glabrescent					small to	red, not glaucous
<i>acutifolia</i>	"	"	mostly acute	pubescent chiefly on the veins					glabrate	black
				mostly acute	glabrescent				medium to per-	
									hairy	
								"	larger	
								"	small	
								"	glabrate	
								"	large or per-	
								"	hairy	
								"	smaller per-	
								"	sistently hairy	

For winter identification of the Genus COTONEASTER see preceding page

species	habit	fruit	branchlets	buds	twig color	pubescence	fruit	fruit position	sepals
<i>souti-folia</i>	spreading bushy	black	moderate	smallish, persistently hairy	red-brown to very dark	twigs hairy			
<i>foveo-lata</i>	spreading	"	"	large, sub-glabrescent	gray-brown to straw color	"			
<i>racemi-flora</i>	spreading and ascending	glaucous red	moderate, rigid	small, silky, finally glabrescent					
<i>hupenensis</i>	arching and drooping	red, not glaucous	very slender	small, glabrate	yellowish	finally glabrate			
<i>dielsiana</i>	erect arching	red, small, hairy at apex	purple to red-brown	moderate	smallish to larger and persistently hairy	"	densely gray-woolly	on lateral spurs, not nodding	
<i>divaricata</i>	spreading	red, oblong	slender	moderate	small, persistently hairy	rusty-brown	glabrescent at least later		
<i>zabelii</i>	"	"	"	moderate	small, persistently hairy	rusty-brownish to brown	branchlets densely pubescent	erect	
<i>interregnum</i>	erect bushy	red, large, glaucous	moderate	large, glabrescent or persistently hairy	"	"	glaucous red	nodding, axillary, large	
<i>acuminata</i>	"	red, large, ellipsoid	moderate	large, glabrate pointed	"	"	"	pubescent near apex	
<i>adpressa</i>	prostrate with creeping stems	red	moderate	small, dull dirty pubescent	"	"	"		
<i>horizon-talis</i>	sub-evergreen	red	moderate	gray to reddish	"	"	"		
	spreading, regularly branched			irregularly distichous					
				strigose					

CYDONIA JAPONICA (*Chaenomeles lagenaria*) is recognized thus
SUMMER : leaves alternate, simple, toothed but not lobed, short-petioled, ovate to oblong, serrate, lustrous and glabrous, with often leaf-like stipules; branches often with terminal and lateral thorns; flowers red, varying from white to pink to deep red and orange; fruit a fairly large yellow pome.

WINTER : a much-branched shrub, with or without thorns; twigs moderate, terete, glabrous, orange or reddish, rigid, with or without terminal and axillary twig spines; leaf scars alternate, small, linear or crescent-shaped or narrowly triangular, raised, with 3 minute bundle traces and with rather long stipule scars; buds sessile, small, solitary becoming multiple, round-ovoid, with few outer scales; end-bud lacking.

CYTISUS SCOPARIUS is recognized thus

SUMMER : a small to moderate sized shrub with green stems; leaves alternate, simple or more usually 3-parted, sometimes minute or lacking, and with minute or absent stipules; leaflets obovate or oblanceolate with few appressed hairs while young, entire; flowers yellow, usually solitary, axillary, the style longer than the keel; fruit a flat, linear-oblong, dehiscent pod with villous margins, the seeds with a thickened and hardened appendage.

WINTER : unarmed and odorless; branchlets bright green, prominently ridged or angled, even almost winged; leaf scars alternate, very small, raised, with one indistinct bundle trace and minute stipule scars; buds small, solitary, sessile, round-ovoid, with about four often indistinct scales.

The Genus DEUTZIA is recognized thus

SUMMER : erect shrubs with peeling bark; leaves opposite, short-petioled, serrate, without stipules; flowers in panicles or cymes, usually terminal on lateral branchlets, white or pinkish; fruit a 3-5-valved capsule, indehiscent.

WINTER : erect shrubs with brown, peeling bark; branches usually hollow; twigs terete, usually dying back at the tip; pith moderate, round, pale and spongy or brown and excavated; leaf scars opposite, 4-ranked, linear or triangular, with 3 bundle traces and no stipule scars; buds ovoid, nearly sessile, with several pairs of outer scales.

Summer Key

species	habit	pith	petals	inflorescence	under side of leaves
scabra	to 6'	brown, excavated	erect, obleng	broad, loose panicle	
rosea	to 3'	white	"	"	rough pubescent
gracilis	to 3'	"	erect, white, obleng	elongated panicle or raceme	glabrous
lemoinei	to 4'	"	spreading, white, broadly ovate	corymbs or cymes	glabrous
parviflora	to 6'	"	spreading, white, roundish-obovate	"	nearly glabrous
					stellate pubescent

Winter Key

species	pith	buds	bud scales	bud size	leaf scars
scabra	brown, excavated	ovoid,	acute		
parviflora	white	canescent	attenuate		
lemoinei	"	Glabrate, brownish,	attenuate	longer than lowest scale	
rosea	"	glabrate, brownish,	ovoid	not so	triangular
gracilis	"	glabrate, brownish	"	"	linear

DIRCA PALUSTRIS is recognized thus

SUMMER : an unarmed shrub with the branchlets enlarged upwards; leaves alternate, simple, entire, short-petioled, obovate, obtuse, cuneate, glaucous beneath; leaf petioles enclosing and concealing the buds; flowers before the leaves, apetalous, short-stalked, pale yellow, in axillary clusters of 2-3 on old wood; fruit a pale green or reddish drupe, ellipsoid.

WINTER : a shrub with soft wood and very, very tough bark, unarmed, odorless; twigs flexible, enlarged upwards, glabrous, brownish with white lenticels, terete; leaf scars alternate, scalloped, almost encircling the bud, 2-ranked, elevated at the swollen nodes, with 5 bundle traces and no stipule scars; buds small, short-conical, solitary, sessile, with about 4 indistinct dark silvery scales; end-bud lacking.

The ELAEAGNACEAE MAY be recognized both summer and winter by the silvery or brown scales which clothe the twigs and branches and leaves and buds.

Genus	species	arrangement	foliage	thorns	twigs	winter buds	fruit	leaf margin	leaves	flowers & fruits
<i>Shepherdia</i>	<i>rotundifolia</i>	opposite	evergreen							
	<i>argentea</i>	"	deciduous	present	silvery					
	<i>canadensis</i>	"	"	without	brown					
<i>Hippophae</i>	<i>rhamnoides</i>	alternate	"	terminal	gray-silvery, brown scurfy end in spines	brown scurfy	bright orange, poisonous	very slender		
<i>Elaeagnus</i>	<i>angustifolia</i>	"	"	lateral	with silvery scales, none brown	no brown scales	dry, yellow, persist.	entire, crisped	silvery both sides	
	<i>argentea</i>	"	"	without	with brown scales	with some brown scales	dry, silvery	soon gone	more or less silvery	pendent
	<i>multiflora</i>	"	"	"	"	with some end-bud conical-ovoid globose	red, juicy, soon gone	—	silvery	—
	<i>umbellata</i>	"	"	"	silvery, with few brown scales	with few brown scales	red, juicy, persis-	pendent	erect	—
						small, appressed, end-bud elongated	ting			

sequence of bloom and fruiting

argentea - flowers in June
angustifolia " May, June
multiflora " April, May
umbellata " May, June

fruits in August ff.
July, August
June, July
September

ELAEAGNACEAE

DIRCA —

The Genus EUONYMUS is recognized thus

SUMMER : deciduous or evergreen shrubs, sometimes creeping or climbing by rootlets; twigs moderate, rounded or 4-lined from the nodes or angled or 4-winged, characteristically green; pith angulated or rounded, spongy or incompletely excavated; leaves opposite or nearly so, petioled, glabrous; flowers in axillary cymes, floral parts in 4's or 5's; fruit a 4-5 celled, lobed capsule (occasionally 2-3 celled); capsule pink or pinkish, orange within, and with black seeds.

species	foliage	habit	leaves	branchlet color	twigs	fruit	buds	capsule color
radicans	evergreen	trailing	broadly oval, dull above					
japonica	"	erect	elliptic to oblong, bright green					
obovata	deciduous	low,	ovovate					
yedoensis	"	prostrate erect	ovovate, large and coarse	orange				
alata	"	"	not as above	greenish			ovoid, scales with long points	
americana	"	"	"	winged				
europea	"	"	"	green	not winged, square	tuberculate	slender pointed divergent	deep rose-red
bungeana	"	"	"	"	terete, often 4-lined		less slender, obtuse buds	deep rose-pink
atropurpurea	"	"	"	"	"	"	elongated, appressed oblong, with loose, oblong scales	very pale yellow- ish or pinkish violet-red

The Genus EUONYMUS is recognized thus

WINTER : shrubs with moderate twigs, rounded or 4-lined or 4-angled or 4-winged, characteristically green; pith angled or rounded, spongy or incompletely excavated; leaf scars opposite or nearly so, half-elliptical, rather small, slightly elevated, with one bundle trace and minute, indistinct stipule scars; buds with imbricate scales, solitary, sessile, with 3-5 pairs of serrulate scales.

species	foliage	habit	twigs	fruit	bud scales	buds	twig color
obovata	deciduous	low, prostrate	corky Winged				
alata	"	erect	not winged,				
americana	"	"	square	smooth, 4-lobed	upcurved	oblong, pointed, upcurved	
europea	"	"	terete, often 4-lined	—	appressed dry-margined	ovoid, obtuse	green
yedoensis	"	"	"	lobes obtuse	—	—	
bungeanus	"	"	"	large, pale pink	long-pointed	ovoid	twigs green, branches orange
atropurpureus	"	"	"	very pale pinkish-yellow	—	slightly elongated	green
japonica	evergreen	"	"	violet-rose	loose, oblong	oblong	purple
radicans	"	trailing or climbing	"				

EUONYMUS -- **Summer Key**

EXOCHORDA GRANDIFLORA is recognized thus

SUMMER : a large shrub; leaves alternate, simple, oblong, cuneate, toothed near the tip, glabrous, glaucous beneath, with one main vein; flowers white with green centers, in loose, terminal racemes; fruit a 5-lobed capsule, persistent, separating into 5 bony sections, finally dehiscent; seeds winged unarmed and odorless; bark reddish, freely peeling, inner bark orange, branches gray-brown; **WINTER** : twigs slender, glabrous, terete, roughened with lenticels and longitudinal fissures; leaf scars alternate, narrow, shallowly V-shaped or linear, raised, with 3 bundle traces and no stipule scars; buds moderate, solitary, sessile, ovoid with pointed and fringed scales.

EUONYMUS -- **Winter Key** -- **EXOCHORDA**

The Genus FORSYTHIA is recognized thus

SUMMER : loose shrubs with yellowish twigs and very bright green foliage; leaves opposite, petiolate, glabrous, occasionally 3-parted, usually serrate; flowers very early, yellow, bell-shaped, axillary, with four oblong lobes; fruit a 2-celled, dehiscent capsule.

WINTER : loosely branched or scrambling shrubs with yellowish twigs and opposite arrangement; twigs somewhat angled, buds moderate and multiple, sessile, with about six pairs of scales; leaf-scars opposite, shield-shaped, rather small, raised, with one bundle trace and no stipule scars.

Summer and Winter Keys combined

species	habit	twig color	pith	flowers	leaves
<i>viridissima</i>	erect, stiff	a little greenish	chambered or all excavated (through nodes and internodes)	with pistil long	long, narrow, plain outline
<i>intermedia</i>	arching	yellowish	solid at nodes, internodes chambered	with pistil short	elongated, partly lobed
<i>suspensa</i>	pendulous	yellowish	nodes solid, internodes excavated	"	or divided on broad shoots

N.B. *F. suspensa* var. *fortunei* is rather erect in growth.

GAYLUSSACIA BACCATA is recognized thus

SUMMER : deciduous; leaves alternate, short-petiolated, entire, with resin-glands above and below; flowers in dense but short racemes, axillary; fruit a berrylike drupe with 10 one-seeded nutlets, calyx persistent; seeds solitary in each fruit cell.

WINTER : twigs slender, terete, with a small pith, young growth resinous-dotted; leaf scars alternate, low, crescent-shaped or triangular, with one bundle trace and no stipule scars; buds solitary, sessile, ovoid, with 2-5 outer scales; end-bud lacking.

GENISTA TINCTORIA is recognized thus

SUMMER : unarmed; leaves alternate, simple, glabrous beneath, ciliate, elliptic-oblong to oblong-lanceolate, entire, usually with small stipules; flowers yellow, in many-flowered, terminal racemes; fruit a linear-oblong pod, compressed but not flat, glabrous or glabrescent.

WINTER : upright or ascending, with the slender, bright green twigs not much branched; twigs ribbed or grooved, terete, glabrous; leaf scars alternate, much-raised, minute, with one indistinct bundle trace, and the stipules more or less persistent.

The Genus HAMAMELIS is recognized thus

SUMMER : erect shrubs with yellowish pubescent branchlets; leaves alternate, short-petioled, lopsided, sinuate-dentate, with large stipules which fall off early; flowers yellow, with strap-shaped petals, in short-peduncled, axillary, few-flowered clusters, occurring in autumn; fruit a tomentose, 2-valved capsule.

WINTER : twigs yellowish-pubescent or tomentose at first; leaf scars alternate, 2-ranked, half-round or 3-lobed, slightly raised, with 3 bundle traces and unequal stipule scars, one round and one elongated; buds naked, oblong, stalked, tomentulose.

Summer and Winter Keys combined

species	leaves	buds	flowers	fruit	calyx
virginiana	obovate or elliptic	short (5-8 mm.)	in late autumn surrounded to 1/2 by the calyx	brownish-yellow inside	
vernalis	obovate, glaucous beneath	short (5-8 mm.)	in late winter surrounded to 1/2 by the calyx	dark red inside	
japonica	broad-ovate, green beneath	long (10 mm.)	in late winter surrounded at base only by calyx	red or purple inside	

HIBISCUS SYRIACUS is recognized thus

SUMMER : leaves alternate, simple, 3-lobed, ovate or rhombic-ovate, coarsely toothed above the middle, cuneate, short-petioled, palmately veined, glabrous, estipulate; flowers rather large and conspicuous, solitary, axillary; fruit a capsule, dehiscent into 5 valves; seeds flattened, with a ring of gray hairs about the margin.

WINTER : bark gray, firm; twigs terete, but fluted near the dilated tip and terminated by relatively large, roundish flower and fruit scars; pith white, green margined; leaf scars alternate, crowded near the ends of twigs, $\frac{1}{2}$ -round or transversely elliptical, raised, with ridges extending below, and with 4 compound and irregular, often irregular, often indefinite scars small, elliptical.

The Genus HYDRANGEA is recognized thus

SUMMER : erect or climbing shrubs with peeling bark; leaves opposite or whorled, petiolate, usually serrate, rarely lobed, without stipules; flowers in terminal corymbs or panicles, often with sterile marginal flowers; fruit a 2-5 celled capsule opening at the apex.

WINTER : soft-wooded shrubs or root-climbers; deciduous; twigs rounded, with a large, continuous, pale pith; leaf scars opposite or whorled, crescent-shaped, frequently three at a node or connected by a line around the twig, with 3 bundle traces and no stipule scars; buds moderate, solitary, sessile or very short-stalked, globose-conical to oblong, with 2-3 pairs outer scales.

Summer Key

species	habit	twigs	leaves	flowers and fruits
<i>petiolaris</i>	climbing	—	—	—
<i>quercifolia</i>	shrubby	tomentose, orange-red	lobed	—
<i>paniculata</i>	shrubby	glabrate	—	paniculate
<i>arborescens</i>	shrubby	glabrate	not lobed	flat-topped cymes

Winter Key

species		bark	buds
<i>petiolaris</i>	climbing	—	—
<i>quercifolia</i>	shrubby	tomentose, orange-brown flaking	—
<i>paniculata</i>	shrubby	brown, firm	round, conical, horizontal
<i>arborescens</i>	shrubby	yellow, firm	spreading, oblong

The Genus HYPERICUM is recognized thus

SUMMER : leaves opposite, short-petioled or sessile, entire, dotted with transparent glands, without stipules; flowers yellow, in terminal or axillary cymes, with numerous stamens; fruit a capsule dehiscent along the partitions.

WINTER : small shrubs with peeling bark; twigs slender, angled below the nodes; pith small, green or brown, spongy and finally excavated; leaf scars opposite, sometimes whorled, rhomboid or lens-shaped, scarcely raised, with one bundle trace and no stipule scars; buds solitary, sessile, minute, with several scales.

Summer Key

species	stems	flowers	flower clusters	number of styles	leaves	cymes
moserianum	terete or 2-edged	in 1-3 flowered clusters		five	narrow ovate	
calycinum	4-angled	solitary in cymes	many-flowered	"	"	
lobocarpum	"	"	few-flowered	"	linear-oblong to lanceolate	
kalmianum	"	"	" terminal	"	linear-oblong	
densiflorum	"	"	three	"	forming a terminal corymb	
prolificum	2-angled	"	axillary	"	narrow-oblong or oblanceolate	axillary

Winter Key

species	stems	angles of stem	buds	habit	inflorescence	capsule	furrows of capsule
moserianum	terete			sub-shrub			
prolificum	winged or angled	two, not persistent		2-1 high			
calycinum	"	four, persistent	scaly	stout, dense shrub			
kalmianum	"	"	scarcely with specialized scales	low, small shrub, stoloniferous	few-flowered cymes	ovoid	
lobocarpum	"	"	"	openly bushy, branches contorted	upright, bushy	many-flowered cymes	5-angled
densiflorum	"	"	"	erect, stiff and dense	in large terminal corymbs	oblong	"
						completely 3-celled	3-angled

ILEX VERTICILLATA is recognized thus

SUMMER : leaves alternate, of moderate size, simple, narrow elliptic or obovate, serrate, acute, cuneate, with impressed veins, estipulate; flowers solitary, axillary, small, whitish, short-stalked; fruit a bright red, globose drupe, holly-like, persistent.

WINTER : an odorless and thornless shrub with smooth dark gray bark; twigs smooth gray, sometimes streaked lighter gray on the upper side; pith green; leaf scars more or less raised, with one bundle trace and minute stipule scars; buds smooth gray streaked light gray, firm and hard, with 2-4 imbricate scales, sessile, superposed.

KOLKWITZIA AMBILIS is recognized thus

SUMMER : leaves opposite, simple, broad-ovate, short-petioled, acuminate, base rounded, margin shallow-toothed or entire, ciliate, hairy beneath; flowers pink with a yellow throat, puberulous, paired forming terminal corymbs on short lateral twigs; fruit a capsule, ovoid, gray-tan, very bristly-hairy.

WINTER: a shrub with freely peeling, gray-brown bark; twigs gray, pilose, with continuous white pith; very much like the Honeysuckles; leaf scars opposite, crescent-shaped or triangular, raised, connected by a line around the twig, with 3 bundle traces often confluent, and no stipule scars; buds gray-velvety, sessile, solitary, ovoid, with 3-4 pairs of scales.

KERRIA JAPONICA is recognized thus

SUMMER : leaves alternate, simple, oblong-ovate, acuminate, doubly serrate; flowers yellow, solitary, perfect, with numerous stamens; fruit a dark brown achene.

WINTER : an unarmed, odorless shrub; twigs bright green, slender, zigzag, 5-angled or ridged, glabrous, pith relatively large, white, continuous; leaf scars alternate, small, 2-ranked, crescent-shaped or triangular, slightly raised, with 3 bundle traces and no stipule scars; buds small, solitary, sessile, oblong, with about 5 outer scales, sub-appressed.

The Genus LIGUSTRUM is recognized thus
 SUMMER : leaves opposite, simple, entire, short-petioled; flowers white, smallish, in terminal panicles; corolla lillac-like; fruit a 1-4 seeded berry-like drupe, black or bluish-black.

Summer Key

species	leaf scar	fruit color	branches	leaves	leaf tip	lenticels	habit	fruit
ovalifolium	broad as bud	—	glabrous	—	—	—	—	—
vulgare	narrow	black, glossy	—	"	—	—	—	—
acuminatum	"	"	pubescent	pubescent above near the margin	acute	—	—	—
amurense	"	dull blue-black	"	glabrous above	obtuse	prominent	—	—
ibota	"	"	"	"	"	"	tall, arching	nodding, pedicelled
ibota regelianum	"	"	"	"	"	"	low, spreading horizontally	"
quihoui	"	"	puberulent	"	"	"	—	sessile

The Genus LIGUSTRUM is recognized thus
WINTER : deciduous but holding the leaves very late; twigs slender, round; pith moderate, white; leaf scars opposite or almost so, small, crescent-shaped or elliptical, raised, with one bundle trace and no stipule scars; buds small, sessile, ovoid, with 2-3 pairs of outer scales, occasionally superposed.

Winter Key

species	leaf scar	branches	fruit color	lenticels	habit	fruit
ovalifolium	broad as bud	Glabrous				
vulgare	narrow	"	black, glossy			
acuminatum	"	pubescent	"			
amurense	"	"	dull, blue-black	prominent		
ibota	"	"	"			
ibota regelianum	"	"	"	"	tall, arching	nodding, pedicelled
quihoui	"	puberulent	"	"	low, spreading horizontal	"
						sessile

The Genus *LONICERA* is recognized thus
SUMMER : leaves opposite, usually short-petioled or sessile, entire, without stipules; flowers in axillary, peduncled pairs, each with 2 bracts and 4 bractlets; corolla tubular; fruit a berry.

species	habit	flowers and fruits	pith	floral color	upper lip of corolla	leaves	leaf tip	winter buds	bractlets	peduncles
sempervirens	climbing	terminal interrupted spikes	red trum- pet with yellow interior	white to yellow	glabrous, glaucous	—	—	—	—	—
japonica	"	axillary pairs	—	—	pubescent	—	—	—	—	—
halliana	shrubby spreading tangled	white	"	—	irregularly ovate acute or oval to obovate obtusish very smooth	—	—	—	—	—
fragrantissima	shrubby ascending	"	"	—	smooth	—	—	—	—	—
standishi	"	crown, pink, not divided	—	—	oblong-ovate acuminate	—	—	—	—	—
korolkowii	"	pink, changing to middle yellow	—	—	oblong-ovate acuminate	—	—	—	—	—
tatarica	"	white or pink changing to yellow	—	—	acute or obtusish	—	—	—	—	—
bella	"	"	"	—	acute or obtusish	—	—	—	—	—
notha	"	white or pink changing to yellow	—	—	acute or obtusish	—	—	—	—	—
muendeniensis	"	"	"	—	acute or obtusish	—	—	—	—	—
xylostemum	"	white or pale yellow	—	—	acute or obtusish	—	—	—	—	—
chrysanththa	shrubby spreading	"	"	—	acute or obtusish	—	—	—	—	—
morrowi	"	"	"	—	acute or obtusish	—	—	—	—	—
ruprechtiana	ascending shrubby	"	"	—	acute or obtusish	—	—	—	—	—
maackii	erect, large shrub	"	"	—	acute or obtusish	—	—	—	—	—

The Genus LONICERA is recognized thus

WINTER : twigs round, slender; leaf scars opposite, crescent-shaped, small, on the tips of the raised bases, with 3 bundle traces and often no stipule scars; buds often superposed, sessile, widely divergent, with numerous 4-ranked scales.

species	pith	buds	twigs	bud size and position	bud scales	habit	bud tip growth	bud growth	lateral buds	twigs hairy
fragrantissima	white	glabrous								
standishii	"	bristly hairy								
xylostethum	brown excavated	elongated very pointed	very hairy	terminal about equal lateral	gray with long ciliate hairs					
chrysanthia	"	"	a little hairy	terminal mostly larger than lateral	"					
maackii	"	"	very scurfy	clustered in twig axils	glabrous, brown					
tatarica	"	not elongated	glabrous	slender-ovate pointed	short, globose or oval, obtusish					
bella	"	"	"	short, acute						
ruprechtiana	"	"	glabrescent or pubescent	spreading						
morrowi	"	"	pubescent	obtuse	very divergent, almost right angled					
notha			"	acute	less divergent, almost right angled					
muendenensis	"	"	"	acute	about eq-terminal to terminal or scarcely developed					
sempervirens			grey or straw-colored, glabrous	acute	less divergent, about 60°					
japonica			red-brown, hairy	acute	scarcely developed					
halliana				acute	densely woolly					

The Genus LYCIUM is recognized thus
 SUMMER : leaves alternate, often fascicled, short-petioled, entire; flowers axillary, solitary or clustered, slender-petioled; fruit a red oblong berry.

Summer Key

species	habit	twigs	leaves	fruit	foliage color	corolla tube
chinense	scrambling, wide spreading, loosely branched	buff-gray	rhombic-ovate to ovate-lanceolate	oblong	bright green	shorter than the limb, rather wide
halimifolium	erect, spreading bushy, with moderate shoots	pale, not hairy in axils	oblong-lanceolate	oval	gray-green	longer than the limb, narrowed below the middle

WINTER : scrambling shrubs with slender spinescent twigs; twigs 5-angled, glabrous, often whitish or short striate; leaf scars alternate, crescent-shaped, small, raised, with one bundle trace and no stipule scars; buds small and inconspicuously multiple or dwarf aggregates with few outer scales.

Winter Key

species	habit	twigs	branchlets
chinense	scrambling, wide-spreading, loosely branched	buff-gray, usually unarmed	light yellowish
halimifolium	erect, spreading, bushy, with moderate shoots	pale, not hairy in the axils; usually spiny	light gray

The Genus **MYRICA** is recognized thus

SUMMER : leaves alternate, almost entire, resinous-dotted; flowers solitary in the axils of bracts forming catkins; fruit a small, globose, or ovoid drupe coated with resinous grains or wax.

***Myrica asplenifolia** (*Comptonia*) has leaves that are toothed or pinnatifid, very long and narrow. **WINTER** : twigs slender and dotted with resin; pitch small, somewhat angled, continuous, Green; leaf scars alternate, $\frac{1}{2}$ -elliptical or a little triangular, somewhat raised, with 3 bundle traces and small or no stipule scars; buds small, solitary, sessile, subglobose or ovoid, with one or two pairs of exposed scales; end-bud lacking.

Summer and Winter Keys combined

species	leaves	fruit	habit	leaf tip	leaf	leaf form	leaf size	twigs
* <i>asplenifolia</i>	elongated, narrow & notched, fernlike	bur-like						
<i>cerifera</i>	short, entire or with few notches	globular covered with wax	tall shrub or small tree to 40'	acute	often persistent			
<i>carolinensis</i>	"	"	low shrub	obtuse	"	ob lanceolate to obovate	fairly large (2-4")	gray
<i>gale</i>	"	conelike catkins enclosed by 2 bracts	"	"	deciduous	ob lanceolate to obovate, serrate near the tip	small (1-1 $\frac{1}{2}$ ")	--

* given elsewhere as *Comptonia asplenifolia*

N.B. twigs, fruit and habit are sufficient winter identification.

NEMOPANTHUS MUCRONATUS is recognized thus

SUMMER : leaves alternate, simple, elliptic to oblong, mucronate, entire or slightly toothed, grayed beneath, slender petioled; flowers small, whitish, axillary, on slender peduncles, polygamodioecious; fruit a drupe, dull red, subglobose, glabrous, with 4-5 bony nutlets and without sepals at the base, long-stalked.

WINTER : shrub, slender-branched and glabrous; twigs often short, more or less glaucous, with the bark finely fissured in age; leaf scars alternate, clustered at the ends, slightly raised, triangular, with one bundle trace and no stipule scars; buds smallish, ovoid, sessile, solitary, with 2-3 ciliate outer scales.

MYRICA

The Genus PHILADELPHUS is recognized thus

SUMMER : branches with solid white pith; bark orange, often but not always peeling; leaves opposite, dentate or entire, with 3-5 large veins from the base; flowers white, moderately large, fragrant, terminal on lateral branchlets, with 4 sepals and 4 petals, usually racemose but sometimes solitary or in 2-3 flowered cymes; fruit a 4-valved dehiscent capsule.

Summer Key

species	older bark	leaves	flowers	petals	styles	anthers	pedicels & calyx	racemes	habit	twigs
gordoni-	yellowish,	pubescent both sides,	odorless				glabrous			
anus	firm	dentate								
lewisii	"	Glabrous, all most entire				"				
virgin-	brown, peeling freely	double					densely pubescent			
alis	"	single, pink				"				
rosace								"		
micro-	thick, entire	solitary or clusters 1-6,					"			
phyllus	"	" or less larger	not racemes simple or com- pound racemes	narrow, long, far exceed the stamens, deeply divided			glabrous			
falcon-			oblong							
jeri	"		acute							
zeyheri	"	"	fragrant	pure white, 5-7, scarcely fragrant	divided $\frac{1}{2}$, long- er than stamens stigmas broad and prominent	white yellow	"			
coronar-	tapering at base		cream-white 3-5, very fragrant	"	shorter than stamens		more or less villous, lobes of calyx gla- brous except edge	rather long loose	erect tall loose	moderate
ius	"			"						
lemoinei	"	"	3-7, very fragrant	"	" stigmas narrow, di- vided $\frac{1}{2}$	"	glabrous or scarcely pubescent	short & dense	low slender twiggly	
grandiflorus	large and thin	in cymes, 1-3 flowered, not fragrant	"	"	glabrous					coarse

The Genus *PHILADELPHUS* is recognized thus

WINTER : bark orange or brown, usually peeling; twigs more or less lined, angular; pith moderate, rounded, continuous, pale; leaf scars opposite, $\frac{1}{2}$ -round, with a thin membrane over the bud, becoming crescent-shaped when this bursts, connected by a line around the twig, with 3 bundle traces and no stipule scars; buds solitary, sessile, with one pair of barely overlapping hairy scales; end-bud lacking.

Winter Key

species	older bark	fruits	lower pedicels	racemes	leaf scars	young branchlets	pedicels & calyx	buds
<i>gordonianus</i>	yellowish, firm	racemes					slightly pubescent	
Lewisii	"	"					Glabrous	glabrous
<i>falconieri</i>	brown, freely peeling	"	long, often articulated or branched	3-5 fruited loose & open	"	"	"	"
<i>zeyheri</i>	"	"	short	"	"	"		
* <i>lemoinei</i>	"	"	"	3-7 fruited, short & dense	narrow	slender	covered* by membrane	
<i>coronarius</i>	"	"	"	5-7 fruited, longer	broad	moderate	more or less villosus	
<i>virginicus</i>	"	"	medium	3-7 fruited	"	"	densely pubescent	
<i>grandiflorus</i>	"	cymose		1-3 fruited			glabrous	

N.B. Winter identification is difficult and not fully decisive.

*There are a number of Lemoine hybrids, for the most part similar in effect to *lemoinei*, except *P. roseace* which has pink or pinkish flowers in spring.

PHOTINIA VILLOSA is recognized thus

SUMMER : a tall unarmed shrub or small tree; leaves alternate, simple, pinnately veined, finely serrate, stipulate, short-stalked, obovate to oblong-obovate, acuminate, cuneate, glabrous above and villosus beneath; flowers white, in corymbs or cymes; fruit a small dome with 4 seeds, open at the top.

WINTER : twigs brown, odorless, moderate, with large lenticels, not spiny but with many short spur-like twigs; leaf scars alternate, 2-ranked, linear-crescent-shaped and very slightly acute, 3-lobed, raised, with 3 bundle traces and no stipule scars; buds solitary, sessile, ovoid, acute, with about 4 slightly keeled and mucronate scales, often slightly red in midwinter.

PTELEA TRIFOLIATA is recognized thus

SUMMER : leaves alternate, peltiolate, palmately compound with 3 leaflets; leaflets sub sessile, ovate to elliptic-oblong, entire or obscurely cuneate; flowers small, greenish, in corymbs; fruit suborbicular, a samara, the seed encircled by the wing, in large clusters.

WINTER : a sparse shrub, unarmed; twigs brownish, moderate, terete, warty and dotted, with a rather large whitish pith; leaf scars alternate, raised, rather large, horseshoe-shaped after the membrane is broken by the growing buds, with 3 bundle traces and no stipule scars; buds concealed under a membrane, small, closely superposed in pairs, low-conical, sessile, silvery-silky; end-bud lacking.

PHYSOCARPUS OPULIFOLIUS is recognized thus

SUMMER : leaves alternate, simple, broad-ovate, 3-5 lobed, toothed, estipular, glabrous; flowers white, in many-flowered corymbs, with an unpleasant odor; fruit a small capsule, with the follicles inflated and dehiscent along both sutures, glabrous

WINTER : loosely branched shrub with shredding and peeling brown bark, under bark orange; twigs terete, 5-lined from the nodes, moderate, with largish, brownish pith; leaf scars alternate, half elliptical or slightly 3-lobed, raised on a cushion with 5 unequal bundle traces, the lowest one largest, and with small stipule scars on the leaf cushion; fruit often persistent.

QUERCUS PRIMOIDES is recognized thus

SUMMER : Habit shrubby, spreading; branchlets soon glabrous; leaves short-petioled, pinnately veined, simple ovate-oblong to oblong, acute, cuneate, undulate-dentate with 3-7 pairs small teeth, glabrous above, grayish tomentulose beneath; flowers in catkins; fruit an acorn, sessile, ovoid, enclosed $\frac{1}{2}$ by the cup, the cup scales tuberculate.

WINTER : twigs moderate, fluted; pith star-shaped in section; buds solitary or collaterally multiple, sessile, globose, ovoid or conical, with numerous 5-ranked scales; leaf scars alternate, rather small, $\frac{1}{2}$ -round, slightly elevated, with 10-12 scattered bundle traces and small stipule scars.

PTELEA -- *PHYSOCARPUS* -- *QUERCUS*

The Genus RHAMNUS is recognized thus

SUMMER : twigs often spiny-tipped; leaves alternate or opposite, with one main vein, serrulate to entire, with stipules; flowers small, greenish, inconspicuous, in axillary clusters; fruit a globose or subglobose drupe.

WINTER : twigs slender, terete with a moderate, white, continuous pith; leaf scars in broken pairs or alternate, crescent-shaped or $\frac{1}{2}$ -elliptical, small, raised, with 3 bundle traces and minute stipule scars; buds moderate, solitary, sessile, naked or with several scales; twigs often ending in a thorn about the same length as the buds.

Summer Key

species	spines	arrangement	buds	twigs	fruits	winter buds	fruit
<i>cathartica</i>	present, scarcely longer than the buds	opposite or nearly so	scaly	slender spinescent			
<i>davurica</i>	"	"	"	stout, glabrous			
<i>frangula</i>	unarmed	alternate	naked	pubescent short	glabrous, separate or in sessile umbels		
<i>caroliniana</i>	"	"	"	puberulous	several in a cluster,		
<i>purshiana</i>	"	"	"	pubescent long	pubescent	hoary tomentose	"
						turbinate	

Winter Key

species	arrangement	branchlets	buds	margin of leaves	fruit	leaves	under side of leaves	flowers
<i>cathartica</i>	opposite or nearly so	usually scaly	scaly	serrate, teeth short or obtuse	large, dull, (1)-4"	light green, thin, broad-ovate to elliptic	with grey-green veins	
<i>davurica</i>	"	"	"	"	"	"	thin, elliptic to oblong	
<i>frangula</i>	alternate	unarmed	naked	usually entire	"	"	lustrous, firm, narrow	
<i>caroliniana</i>	"	"	"	"	"	"	with 8-9 pairs of veins	sometimes solitary, sinuous
<i>purshiana</i>	"	"	"	"	"	"	8-10 pairs of veins	in peduncled umbel-like cymes, pubescent
							8-15 pairs of veins	

RHODOTYPOS KERRIOIDES (syn. *R. scandens*) is recognized thus
SUMMER : leaves opposite, simple, ovate to ovate-oblong, acuminate, base rounded, sharply doubly serrate; flowers white, large, with 4 suborbicular petals and 4 sepal-like bracts; fruit a dry drupe, shiny brownish-black, obliquely ellipsoid, in clusters of four set above the persistent sepals.

WINTER : a loosely branched shrub; twigs moderate, glabrous, red-brown, somewhat lenticular; leaf scars opposite, crescent-shaped, moderate sized, ciliate at the top and connected by a ciliolate line, with 3 bundle traces and no stipule scars; buds moderate, becoming collaterally imbricate and at length very slightly stalked, ovoid, glabrous, with about 6 pairs of scales.

The Genus RHUS may be recognized thus

SUMMER : leaves alternate, pinnately compound, three to many-parted or simple, aromatic when crushed; flowers small, in terminal or axillary panicles; fruit a globose or compressed drupe, hairy or resinous, in compact clusters; twigs usually coarse.

Summer Key

species	nature	fruits	habit	leaves	inflorescence	leaf margin	leaf rachis	leaf surface	twigs
<i>radicans</i>	poisonous	glabrous, trailing or climbing	erect	three-parted	axillary			glaucous	
<i>vernix</i>	"	"	erect	many-parted	"		"	"	
<i>aromatica</i>	non-poisonous	red, hairy	"	three-parted	"			pubescent	
<i>copallina</i>	"	"	"	many-parted	terminal	entire or obscurely serrate	winged	glossy	
<i>javanica</i>	"	"	"	"	"	coarsely serrate	"	brown-hairy beneath	
<i>glabra</i>	"	"	"	"	"	coarsely serrate	"	not winged	glaucous
<i>typhina</i>	"	"	"	"	"	"	"	glaucous beneath	glaucous
<i>cotinus</i>	"	black	"	simple	"	entire	"	densely hairy	densely hairy
								glaucous	glaucous

The Genus RHUS is recognized thus

WINTER : twigs round or bluntly 3-sided, sometimes fluted, slender to very stout, pungently aromatic when cut or bruised, either very hairy or with prominent lenticels or smooth; leaf scars alternate, round or crescent-shaped or C-shaped and encircling the buds, more or less raised, with numerous bundle traces sometimes collected in groups and without stipule scars; buds moderate or rather small, solitary, sessile, round-ovoid, hairy and indistinctly scaly or with 3-4 evident scales; end-bud often lacking.

Winter Key

Species	habit	fruits	sap	leaf scars	twigs	lenticels	twig color
radicans	poisonous, trailing or climbing by aerial roots	glabrous, whitish	-	-	-	-	-
vernix	poisonous, erect shrubby	"	-	-	-	-	-
aromatica	non-poisonous, erect, shrubby	axillary red-hairy	offensively pungent	elevated, round, covering buds	-	-	-
cotinus	"	terminal, black, in plumose clusters	gummy, aromatic	elevated	-	-	-
copallina	"	terminal, red-hairy, nodding	"	not elevated, U-shaped	not hairy	numerous, prominent, almost warty	orange-yellow
javanica	"	terminal, erect	"	not elevated, C-shaped	sparsely hairy	slightly prominent	dark
typhina	"	"	"	"	densely hairy	concealed by hairs	brown to black
glabra	"	terminal curved	"	"	not hairy	visible, not prominent	red, glaucous

The Genus RIBES may be recognized thus

SUMMER : unarmed or prickly shrubs; leaves 1-2" broad, alternate, petioled, simple, with 3-7 notched lobes, palmately veined, estipulate; flowers perfect or dioecious, 5-merous, in few to many flowered racemes, rarely clustered or solitary; fruit a small, sour, juicy, many-seeded

berry crowned by the remains of the calyx.

WINTER : stems prickly or unarmed; twigs rounded, moderate in size, with decurrent ridges below the nodes; buds small, ovoid, solitary, sessile or becoming short-stalked, with about 6 loose scales; leaf scars alternate, linear or U-shaped or broadly crescent-shaped, slightly raised, with 3 bundle traces and no stipule scars.

Summer Key

species	habit	flower clusters	flowers	floral color	under side of leaves	young branchlets	leaf form	sepals
alpinum	low, dense twiggly	erect racemes	short, inconspicuous	red, pink or white	white	pubescent, often sparingly glandular & aromatic		
sanguineum	loose, open	pendulous racemes	showy	or white	yellow	pubescent	ovate to roundish	less than the length of calyx tube
odoratum	"	"	"	"	"	"	roundish to obovate	more than long as calyx tube
aureum	"	"	"	"	"	"	"	"

N.B. The gooseberries have spines at the nodes and prickly fruits and more narrow leaf scars, while the currants are unarmed or seldom prickly

Winter Key

species	habit	leaf scars	leaves in bud	branchlets	buds
alpinum	low, dense twiggly	narrow		nearly glabrous, buff	stalked
sanguineum	loose, open	broad	plaited	pubescent, often sparingly glandular and aromatic	"
odoratum	"	"	convolute	pubescent	"
aureum	"	broad	"	glabrous or puberulous	not stalked

The Genus ROSSIA is distinguished thus

Cuscuta rossii is distinguished thus
SUMMER : twigs thorny, rarely unarmed; leaves alternate, pinnately compound, stipulate; flowers terminal, solitary or in corymbs, floral parts in 5's, pistils numerous, enclosed in an urn-shaped hip which becomes fleshy and berrylike enclosing several - to many-bony achenes.
WINTER : mostly shrubs, occasionally trailing or scrambling; branches moderate, terete, armed with prickles, often hooked prickles; leaf scars low, broadly crescent-shaped or almost linear, with 3 bundle traces and no stipule scars.

Summer and Winter Keys combined

species	habit	number of leaflets	stems	leaflets	flowers	branchlets	prickles & prickles	branches	akenes	stipules	Fruit
<i>wichuri-</i> <i>ana</i>	prostrate, evergreen	nine		lustrous, glabrous obtuse, broad							
<i>multi-</i> <i>flora</i>	high climbing, deciduous	seven		pubescent, obovate to oblong	small, white in large clusters					small in large cluster	
<i>setigera-</i> <i>deciduous</i>	upright, with arch- ing branch- es	3, rarely 5		ovate, oblong, large pubescent on veins beneath							
<i>blanda</i>	erect, bushy										
<i>rugosa</i>	"			very thorny	rugose	tomentose	needle-like nearly straight				
<i>spicu-</i> <i>taris</i>	"	3-7	oblong	not rugose		needle-like	unarmed except succers				
<i>nitida</i>	"	7-11		"		needle-like	with prickles				
<i>caroli-</i> <i>na</i>	"	5,rarely elliptic	7 red	dull above		Glabrous	"			prickly also on flowering branchlets	
<i>canina</i>	"	5-7	—	green singly serr- ate		Glandular	"	"	"	flat	
<i>rubigin-</i> <i>osa</i>	"	5-7	broadly oval	"	doubly serr- ate, glandu- lar, fragrant	Hispid	"	"	"	"	
<i>spinosa-</i> <i>issima</i>	"	usually 9		very small, base rounded	white to pink	Plattened at base or strongly hocked					
<i>hugonis</i>	"	5-13	red- brown	small oval single		thorns much dilated	"			only in bottom of hip	
<i>zanthine</i>	"	7-13	"	villous broad-oval	double yellow	thorns not dilated	"				
						flowering branchlets	"			narrow black with di- vergent & dilated auricles	
						flowering branchlets	"			bristly base least never bristly	red
						flowering branchlets	"			"	"
						flowering branchlets	"			"	ROSA

The Genus RUBUS may be recognized thus

SUMMER : stems prickly and short-lived; leaves alternate, 3-parted or pinnately compound and with stipules; flowers showy, white to pink, in racemes or panicles or corymbs or solitary, usually terminal; floral parts in fives; fruit an aggregate of drupelets.

Summer Key :

species	habit	leaves	fruit surface	flowers	stems	fruit	prickles
<i>odoratus</i>	erect, unarmed	simple					
<i>spectabilis</i>	erect, armed	compound	orange	solitary, nodding, large	glabrous, with numerous fine prickles below	hollow, separating from the torus	
<i>occidentalis</i>	"	"	black, bloomy	moderate, in many-flowered corymbs	moderate, in very glaucous	"	short
<i>idaeus</i> , var. <i>striosus</i>	"	"	red, tomentu-lose	moderate, in finely	"	"	
<i>allegheniensis</i>	"	"	black, bloomy	in densely glandular-hispid racemes	glandular pubescent	not hollow, retaining the torus	few, broad
<i>caesius</i>	creeping or prostrate	compound, with narrow stipules attached to petiole	"	in corymbs, few-flowered, pubescent, glandular & prickly	glaucous, terete, of a few large drupelets	weak, sparse, scattered	stout, straight
<i>procumbens</i>	"	compound	"	"	sub-terete, glabrous	"	stout, recurved

N.B. This group of Rubus does not develop flowers on first-year wood.

The Genus RUBUS is identified thus
WINTER : twigs short-lived, soft-wooded, armed with prickles, moderate, often 5-angled, leaf scars alternate, torn and irregularly shrivelled, on a much-raised and persistent petiole base, with the bundle traces completely indistinct and no stipule scars.

Winter Key

Species	habit	bark	stems	prickles	canes
<i>Codonatus</i>	erect unarmed	shredding	villous and glandular		
<i>Idaeus</i> *	"	not shredding	finely tomentose, straw-colored	more straight, numerous, bristly-like	at most very stoloniferous
<i>Spectabilis</i>	erect, armed	"	glabrous, with numerous fine prickles below		
<i>Occidentalis</i>	"	"	very glaucous, purple	short, stout, and recurving,	
<i>Allegheniensis</i>	"	"	stellate-pubescent near the apex, grooved,	persistant, strongly hooked rooting at the tip	more straight, especially at most very stoloniferous
<i>caesius</i>	creeping or prostrate	"	glaucous, terete, slightly puberulous	on stems, persistant	
<i>procumbens</i>	"	"	sub-terete, glaucous	weak, sparse, scattered	
				stout, slender	
				straightish	

* consider *strigosus* as a variety of *Idaeus*

The Genus *SALIX* is recognized thus

SUMMER : TWIGS very flexible; leaves alternate, petiolate or sessile, mostly lanceolate, toothed or entire, often stipulate; flowers in catkins with or before the leaves; fruit a 2-valved capsule.

WINTER : Bark smooth, wood soft, twigs very flexible; leaf scars alternate, low, U-shaped, with 3 bundle traces and short, if any, stipule scars; buds oblong, appressed, sessile, solitary, with one cap-like scale which splits on the inside next the twig.

Summer and Winter Keys combined

species	mature leaves	underside of leaves	buds	habit	branchlets	leaf form	Leaf margin	leaf tip	fruits
<i>caprea</i>	glabrous	glaucous or glaucescent	stout & reddish	tree or shrub	young branchlets pubescent	elliptic	serrate	acute or abruptly acuminate	
<i>discolor</i>	"	"	more slender and nearly black	shrub	young branchlets tomentose	generally oblanceolate	"	more or less acuminate	
<i>irrorata</i>	"	"	white-villous	"	"	lanceolate to blandy	obscurely serrulate		
<i>lucida</i>	green	moderately large	"	lustrous, yellow-brown	ovate-lanceolate to oblong-lanceolate with glandular petiole	glandular-serrate	sub-entire	dull straw-color bottle-necked	
<i>pentandra</i>	"	"	"	"	"	ovate-lanceolate to oblong-lanceolate with a glandular petiole	"	lustrious straw-color tapering gradually	
<i>incana</i>	villous with loosely appressed hairs	densely pubescent orange-red	moderate a large shrub to villous 20' or 40'	orange-red	linear	serrulate near apex, revolute	"	shortly acuminate	
<i>humilis</i>	"	Clauous and soft pubescent	small a shrub 3' to 9'	pubescent or tomentose	oblanceolate to oblong-lanceolate	entire or subentire			
<i>tristis</i>	"	Glabrescent	small a shrub to 2 mm. to 18"	glabrescent	narrowly oblanceolate to linear lanceolate				

Also see *Salix* among the trees

The Genus **SAMBUCUS** may be recognized thus

SUMMER : open shrubs with coarse, angled twigs; pith large and soft, continuous; leaves opposite, pinnately compound; leaflets serrate; flowers small, in terminal compound corymbs or panicles; floral parts in 5's; corolla rotate; fruit a berry-like drupe with 3-5 nutlets.

WINTER : branches stout; pith large and soft, continuous; leaf scars opposite or whorled, broadly crescent-shaped or triangular or rhomboid, large, low, more or less connected around the twig, with 3-5-7 bundle traces and no stipule scars; buds solitary or multiple, the larger ones stalked, ovoid, with 3-5 pairs of scales; end-bud usually lacking.

Summer Key

Species	fruit	flowers	twigs	foliage color	under side of leaves	leaflets	odor
<i>racemosa</i>	red	convex cymes or panicles	often 4-angled	bright green	glabrous	usually 7	slight
<i>canadensis</i>	black	flat cymes	terete	dark green	pubescent	usually 5	disagreeable
<i>nigra</i>	black	"	"	"	while young	"	when bruised

♂

Winter Key

species	pith	branches	lenticels	odor
<i>racemosa</i>	brown	light brown	"	"
<i>canadensis</i>	white	yellow gray	moderate	slight
<i>nigra</i>	white	gray	numerous and prominent	strong and disagreeable when crushed

The Genus SORBARIA is recognized thus

SUMMER : leaves alternate, pinnately compound, thin, sharply serrate, stipulate; leaflets lance-oblong; flowers white, in large terminal panicles, floral parts in fives; fruits tan-colored, dehiscent capsules.

WINTER : low shrubs, not twiggy nor much branched; twigs rather stout for the size of the plant, glabrous and terete; pith rather large, brown, continuous; leaf scars alternate, relatively large, rounded or irregular in form, scarcely raised, with 3 bundle traces and no stipule scars.

Summer and Winter Keys combined

species	twigs and buds	habit	flowers	fruits	leaf margin
<i>lindleyana</i>	red-brown	shrub to 8'	in mid-summer clusters 8-12"	on recurved pedicels	doubly serrate
<i>sorbifolia</i>	gray-brown	shrub to 5'	late spring, clusters 5-12"	upright	"
<i>aitchisonii</i>	red to purple	shrub to 7' or 10'	late summer clusters 8-12"	"	singly serrate

The Genus SPIREA may be recognized in

SUMMER : leaves alternate, simple, dentate or serrate or sometimes lobed, rarely entire, with short petioles and no stipules, pinnately veined; flowers small in umbel-like racemes, corymbs or panicles, floral parts in fives; fruits tan-colored capsules, dehiscent at the top.

Summer Key

species	flowers	leaf margin	leaves	floral color	inflorescence
<i>van houttei</i>	umbels, with the leaves, on new shoots often lobed	incisely serrate, apex acute	glabrous,	white	
<i>hypericifolia</i>	umbels before leaves, entire on old wood	"	"	"	
<i>thunbergii</i>	"	serrate or dentate	linear-lanceolate, glabrous	"	3-5 flowered, sessile
<i>arguta</i>	"	"	oblong, finely pubescent when young	"	many-flowered, lower umbels stalked
<i>prunifolia</i>	"	denticulate	oblong, pubescent beneath	"	umbels all sessile, 3-6 flowered
* <i>bumalda</i>	corymbs at tips of branches	"	"	pink or white	flat-topped corymbs
<i>tomentosa</i>	panicles	unequally serrate	tawny beneath, ovate	pink	brownish tomentose
<i>billiardii</i>	"	sharply doubly serrate	pubescent, oblong	"	tomentulose
<i>salicifolia</i>	"	sharply serrate	Glabrous, lanceolate	"	"
<i>alba</i>	"	often doubly serrate	Glabrous, elliptic	white	tomentose
<i>latifolia</i>	"	sharply serrate	glabrous, ob lanceolate	"	gla brous

**bumalda* var. *antony watereri* is a better color than the type.

The Genus SPIREA is recognized thus

WINTER : shrubs, low and little branched or with slender, arching, wand-like branches; twigs terete or angled from the nodes, more or less zigzag; with small, rounded, continuous; buds small, usually solitary or occasionally laterally multiple, sessile, globose or spindle-shaped, with about 6 outer scales; leaf scars alternate, round or crescent shaped, minute, often much raised, with one bundle trace and no stipule scars.

Winter Key

species	buds	twigs	branchlets and buds	lateral twigs	bud arrangement	bark color	pubescence	vestiges of inflorescence
<i>van houttei</i>	conical, with several out- er scales	slender terete	glabrous					
<i>hypericifolia</i>	ovoid	sub- terete	pubescent					
<i>prunifolia</i>	"	more or less angled	"	Pine, zigzag	often collat- erally multiple	gray		
<i>arguta</i>	"	"	puberulous or glabres- cent	filiform	"	red- brown	gray or dingy	
<i>thunbergii</i>	"	"	"	numerous	"			
<i>bumalda</i>	"	"	not glaucous		solitary	yellow- brown	"	
<i>tomentosa</i>	"	"	slender nor numerous		multiple	"	"	persistent corymbs at tips of branches
<i>billiardii</i>	"	"	brown tomentose	"	"	"	"	persistent pan- icles, brown- tomentose
<i>salicifolia</i>	"	"	puberulous	"	"	gray- brown	"	paniculate dingy-tomentose
<i>alba</i>	"	"	"	"	"	yellow- brown	"	panicles pubescent
<i>latifolia</i>	"	"	glabrous	"	"	red- brown	"	panicles dingy tomentose
						bright none or dark red- brown	"	panicleate, glabrous

STAPHYLEA TRIFOLIA is recognized thus

SUMMER : leaves opposite, pinnately compound with 3 leaflets, stipulate and stipellate, lateral leaflets sessile, unequally serrulate, elliptic to ovate; the stipules deciduous; flowers regular, in terminal panicles, sepals and petals of equal length, greenish-white or slightly pinkish, inconspicuous; fruit an inflated, membranous capsule, 3-lobed, dehiscent, with several shiny, bony seeds.

WINTER : twigs with smooth, striped bark, moderate, terete, glabrous, with a rather large pith; leaf scars opposite, 2-round, slightly raised, with 3-7 bundle traces which are compound, and the stipule scars 2-round or elongated; buds ovoid, with 2-4 scales, solitary, sessile, glabrous; the end-bud usually lacking.

STEPHANANDRA FLEXUOSA (syn. *incisa*) is recognized thus

SUMMER : leaves alternate, 2-ranked, serrate and deeply lobed, ovate, long acuminate, pubescent on the veins beneath, stipulate; flowers small, greenish-white, in loose terminal panicles, the bracts awl-like and shorter than the slender peduncles.

WINTER : branches slender, zigzag, nearly round or slightly 5-lined from the nodes, red-brown; leaf scars alternate, 2-ranked, small, 1-round or triangular, a little raised, with 3 bundle traces and rather large stipule scars; buds superposed, small, ovoid or oblong, with about 4 outer scales.

The Genus **SYMPHORICARPUS** is recognized thus

SUMMER : leaves opposite, short-petioled, entire or occasionally lobed on vigorous shoots, and without stipules; flowers small, axillary, usually forming clusters or terminal spikes; fruit a 2-seeded berry.

WINTER : deciduous shrubs with slender, arching branches, more or less pubescent; pith small, brownish, usually excavated; buds small, solitary or collaterally multiple or developing lateral branches the first season, ovoid-oblong, more or less compressed, sessile, with about 3 pairs of keeled scales; leaf scars opposite, 1-round, small, ragged or torn, raised, partly connected by transverse ridges, with one indistinct bundle trace and no stipule scars.

Summer and Winter Keys combined

species	inflorescence	fruit	pith	corolla	young branchlets
<i>racemosa</i>	terminal racemes	white	excavated	pubescent inside	glabrous
<i>vulgaris</i>	axillary clusters	red	—	continuous	pubescent inside

The Genus SYRINGA is distinguished thus

SUMMER : shrubs or small trees with opposite, petiolate leaves having the margins entire; flowers and fruits in terminal or lateral panicles on wood of the previous season; calyx and corolla with four parts, corolla saucer-shaped with a tube and four valvate lobes; stamens two; fruit an oblong capsule splitting in two parts.

WINTER : deciduous shrubs or small trees; twigs moderate or slender; pith moderate, homogeneous, round, pale in tone; buds usually solitary, sessile, ovoid, with about four pairs of exposed scales, end-bud frequently absent and the branches forked; leaf scars opposite, crescent or shield-shaped, raised, rather small, with one compound bundle-trace and no stipule scars.

Winter identification of species is uncertain and incomplete at present.

species	flowers	habit	inflorescence	corolla lobes	panicles	underside of leaves	corolla tube	branchlets	anthers	leaves	flower clusters
pekinensis	cream-white corolla tube short	large shrub								cuneate	
amurenensis	"	"								base rounded	
japonica	"	small tree bark cherry-like								subcordate	
emodi	not yellowish, corolla tube longer than calyx	shrub, with simple leaves	terminal, reflexed, leafy at stamens the base protruding	papillose	much longer than calyx						
reflexa	"	"	"	"	"	"	"	"	"		
yunnanensis	"	"	"	"	"	"	"	"	"	"	"
josi-kaea	"	"	"	"	"	"	"	"	"	"	"
wolfi	"	"	"	"	"	"	"	"	"	"	"
swegin-zowi	"	"	"	"	"	"	"	"	"	"	"
villosa	"	"	"	"	"	"	"	"	"	"	"
persica	"	"	"	"	"	"	"	"	"	"	"
chinensis	"	"	"	"	"	"	"	"	"	"	"
vulgaris	"	"	"	"	"	"	"	"	"	"	"
oblata	"	"	"	"	"	"	"	"	"	"	"
meyeri	"	"	"	"	"	"	"	"	"	"	"
palibiniana	"	"	"	"	"	"	"	"	"	"	"
microphylla	"	"	"	"	"	"	"	"	"	"	"
pinnatifida	"	Shrub, leaves compound	"	"	"	"	"	"	"	"	"

The Genus TAMARIX is distinguished thus

SUMMER : a very fine-textured shrub or tree; branches very slender, terete, the ultimate small branchlets falling with the leaves; leaves small, almost scale-like, often sheathing; flowers small, short-pedicelled or sessile in dense racemes collected in terminal panicles; fruit a dehiscent capsule with many minute seeds and with a tuft of hairs at the apex.

WINTER : shrubs or small trees with slender branches; pith small, not central; twig lacking leaf scars, bundle traces or stipule scars; the dilated base of the alternate leaves persisting; buds small, sessile, rounded, appressed, solitary or concentrically multiple, with about 3 scales.

Summer Key

species	flowers	floral parts	foliage	petals	branches	disk	blooming season
parviflora	lateral racemes on last year's wood	in 4's	blue-green		arching		earliest of all
gallica	terminal panicles on wood of current year	in 5's	bright green or yellow-green	deciduous	spreading, glabrous	5-angled or 5-lobed	
pentandra	terminal panicles, slender		pale green	glaucous or persistent	glabrous, upright	10-lobed	

Winter Key

species	habit	twigs and buds	buds
pentandra	upright	purple	glabrous, small
parviflora	arching	dark purple	glabrous, small
gallica	spreading	red-brown	small, globose and very hairy, multiple

The Genus VACCINIUM is recognized thus

SUMMER : leaves alternate, short-petioled, glabrous or puberulent beneath, entire or serrate, narrow-elliptic to oblong lanceolate or obovate, acute both ends; flowers axillary or terminal, solitary or in racemes, the corolla cylindric and $\frac{1}{2}$ -lobed; fruit a fleshy, many-seeded berry with persistent calyx lobes, bloom blue-black.

WINTER : unarmed, odorless shrubs; branchlets slender or very slightly angular, somewhat hairy, brown or greenish tinged red, nearly glabrous and smooth; leaf scars alternate, very small, $\frac{1}{2}$ -round or crescent-shaped, slightly raised, with one bundle trace and no stipule scars; buds small, ovoid, solitary, sessile, with two or more pointed scales; end-bud usually lacking.

Summer and Winter Keys combined

species	habit	branchlets	buds	leaves	flowers	habitat
<i>corymbosum</i>	tall shrub	angled and warty	ovoid, scales pointed	glabrous beneath, entire or nearly so	cylindric corolla, longer than broad	moist woods or bogs
<i>pennsylvanicum</i>	low and dwarf	grooved above buds, puberulous	"	glabrous both sides, serrulate with bristle-pointed teeth	short-cylindric, broader than long	dry, sandy slopes

The Genus VIBURNUM is recognized thus

SUMMER : shrubs or small trees; leaves opposite, rarely whorled, entire, dentate, or lobed, usually without stipules; flowers small, white or pinkish, in umbel-like or paniculate compound cymes, floral parts in 5's; fruit a one-seeded drupe with the stone usually compressed.

Summer Key

species	foliage	branchlets	fruit	leaves	leaf form	flower clusters	petiole	leaf scars	winter leaf buds	leaf color
<i>americanum</i> lobeD	glabrous		red	glabrous below	—	—	with broad			
<i>opus</i>	"	"	"	pubescent below	—	—	shallow glands & small			
<i>acerifol-</i> <i>ium</i>	pubescent	black	bluish black	densely pubescent below & black dotted	—	—	with narrow grooves and large glands			
<i>rhytidio-</i> <i>phyllum</i> <i>cassin-</i> <i>oides</i>	not lobed persistent	stellate-pubescent	—	sub-evergreen	—	—	—			
<i>lentago</i>	"	"	"	remotely dentate	peduncles shorter than the cyme	—	soon leaden			
<i>prunifo-</i> <i>rum</i>	glabrous,	"	"	sharply finely serrate	umbel-like flat, sessile	with broad, wavy margin	leaden			
<i>rufidulum</i>	rigid				—	not marginated	rusty-pubes-			
<i>molle</i>	puberulous with peeling bark	blue-black	dull pubescent beneath	broadly ovate	—	—	tinged red with deep scales			
<i>dentatum</i>	glabrous	"	lustrous red	both sides pubescent, with more than 5 pairs of veins	—	—	bright green	"		
<i>dilatatum</i>	pilose	"	"	"	—	—	"	"		
<i>sieboldii</i>	pubescent	red changes to black	oblong	all flowers elliptic, panicle-like	—	broad, relatively narrow	bright green	"		
<i>tomentosum</i>	stellate tomentose	"	"	marginal flowers sterile & enlarged	without stipules	—	dark green	"		
<i>lantana</i>	scurvy pubescent	"	closely dentate	"	umbel-like, flat, of small flowers	naked	dark green			
<i>carlesi</i>	stellate-tomentose	"	coarsely dentate	"	flat, of fertile flowers					
<i>burkwoodi</i>	puberulous	glossy	glossy	"	umbel-like, pinkish, large very fragrant					
					white, flushed					

The Genus VIBURNUM may be recognized thus

WINTER : twigs moderate, more or less hexagonal, pith continuous, white or brownish; leaf scars opposite, crescent-shaped, raised or meeting on connected, with 3 bundle traces and no stipule scars; buds solitary or rarely superposed, usually stalked, scaly or naked, ovoid or oblong.

Winter Key

species	foliage persistent	branches	buds	bud scales	leaf scar	bud form	twig	bark	bud color	fruit
<i>rhytidophyllum</i>										
<i>lantana</i>	deciduous	naked			narrow			stout, densely pubescent, scurfy		
<i>carlesii</i>	"	"			"		"	more slender, stellate-tomentose		
<i>mollis</i>	"	scaly imbricate	"	"	"		glabrous, gray	peeling		
<i>dentatum</i>	"	"	"	"	"	"	"	firm		
<i>acerifolium</i>	"	"	"	"	"	squared	pubescent	"		
<i>prunifolium</i>	"	rigid	"	valvate	"	"	oblong, reddish, pubescent, or flask-shaped	a little leaden		
<i>rufidulum</i>	"	"	"	"	"	"	rusty-pubescent, stout, rigid	rusty, tired		
<i>dilectum</i>	"	more flexible	"	scaly hispid	outer scales parted	relatively narrow	sub-ovoid	stout, very hairy, hispid		
<i>sieboldii</i>	"	"	"	short, closely valvate	broad, meeting	stout, pubescent	stout, pubescent	stout, pubescent		
<i>as</i>				scaly, closely like a sack						
<i>tomentosum</i>	"	"	"	not hispid	relatively narrow	sub-ovoid	brown, stellate-tomentose	brown		
<i>cassinoides</i>	"	"	"	"	"	flask-shaped	dull brown, scurfy	brown		
<i>Lentago</i>	"	"	"	"	"	"	dull leaden	leaden		
<i>opulus</i>	"	"	"	"	"	"	oblong, pointed	red to green		
<i>americanum</i>	"	"	"	"	"	"	ovoid	loses color	remains plump and bright red	

The new variety burkwoodi is recognized by Mr. Rehder as a variety of carlesii, from which it is easily distinguished by the less hairiness; twigs being puberulous or glabrous rather than tomentose.

The Genus WEIGELA is recognized thus

SUMMER : leaves opposite, short-petioled to sessile, serrate, without stipules; flowers in axillary cymes, often panicled at the end of branchlets; corolla funneliform, floral parts in 5's; fruit a 2-valved capsule.

WINTER : branches moderate, with solid pith, bark scurfy gray, with rather large circular lenticels; twigs straw-colored or brownish, with 2-4 decurrent hairy ridges from the nodes; leaf scars opposite or in whorls of three, broadly shallow crescent-shaped, connected by lines, with 3 bundle traces and no stipule scars; buds with several pairs of pointed scales, often superposed, sessile, oblong, appressed; fruits persistent, linear, 2-valved, dehiscent capsules, with the central partition exposed and extending.

Summer Key

species	branchlets	flowers	leaves	under side of leaves
<i>Diervilla</i> <i>lonicera</i>	glabrous or nearly so, terete	yellow	hairy on edges	
<i>floribunda</i>	pubescent		dark crimson, sepals linear, distinct, seeds winged	villous pubescent chiefly on veins
<i>amabilis</i>	with 2 rows of hairs		pubescent above rosy-pink, sepals lanceo- late, connate, seeds not winged	pubescent or tomentose on veins

Winter Key

species	branchlets	fruiting capsule
<i>Diervilla</i> <i>lonicera</i>	glabrous	glabrous, slender-beaked
<i>amabilis</i>	with 2 rows of hairs	glabrous
<i>floribunda</i>	pubescent or with hairs	pubescent

XANTHOCHERAS SORBITOLIUM is recognized thus

SUMMER : shrub or tree; leaves alternate, pinnately compound; the leaflets opposite, sessile, serrate; flowers white with a red or yellow blotch at the base of the petals, polygamous, in racemes, slender-stalked, the upper flowers fertile, lower ones usually sterile; fruit a green, 3-valved capsule.

WINTER : a tree-like shrub; twigs moderate, terete, raised, with 3 large bundle traces and no stipule scars; buds moderate, solitary, sessile, round-ovoid, with about 6 more or less fringed or toothed scales, glossy chestnut brown.

XANTHORRHIZA APIIFOLIA (syn. *simplicissima*) is recognized thus

SUMMER : a small, low shrub with bitter bark and yellow root; leaves alternate, clustered, long-stalked, 3-parted, incisely toothed, celery-like; flowers brownish-purple, very small, in terminal pendulous compound racemes; fruit a one-seeded follicle, dry and dehiscent.

WINTER : twigs terete, moderate, smooth; leaf scars alternate, low, shallowly U-shaped, more than half encircling the twig, with 10-12 bundle traces and no stipule scars; buds very unequal, the terminal bud enlarged, spindle-shaped, with about 5 mucronate scales, the lateral buds small, solitary, sessile, ovoid-oblong, compressed and appressed, with three blunt scales.

ZANTHORRHIZA AMERICANA is recognized thus

SUMMER : aromatic shrub or small tree; young branchlets pubescent, with large prickles in pairs below the nodes; leaves alternate, pinnately compound with 5-11 leaflets; leaflets opposite, ovate or elliptic, acuminate, entire, pubescent beneath, with pellucid dots; flowers before the leaves, dioecious, small, yellow-green, in axillary fascicles on two-year wood; fruit blackish.

WINTER : aromatic or pungently acrid, armed with detachable paired prickles which are often widened at the base; twigs moderate or a little stout, terete, with a creamy white pith; leaf scars broad, broadly triangular or 3-lobed, scarcely raised, with a conspicuous articular membrane, with three bundle traces and no stipule scars; buds small to moderate, rusty-red, woolly, superposed, sessile, globose, with indistinct scales.

KEY TO THE WOODY CLIMBERS WHEN IN FOLIAGE

- A. Leaves evergreen.
leaves opposite, oval-oblong, smallish, toothed, pinnately
veined Euonymus
Leaves alternate, ovate, often lobed but not toothed, palmately
veined or at least with 3 veins from the base . . . Hedera
- AA. Leaves deciduous.
B. Leaves opposite.
C. Leaves compound.
Climbing by aerial roots or by tendrils at the tip
of the leaves Bignonia
Climbing by twining petioles or stems Clematis
CC. Leaves simple.
Climbs by twining stems or occasionally by aerial rootlets.
Sap milky Periploca
Sap not milky
Leaves entire, short-stalked or sessile Lonicera
Leaves toothed or lobed, distinctly petiolate.
Margin of leaves sparsely toothed, almost entire;
leaf scars horseshoe-shaped Decumaria
Margin of leaves distinctly serrate; leaf scars
crescent-shaped Hydrangea
Margin of leaves dentate; leaf scars C- or
V-shaped Schizophagma
- BB. Leaves alternate
D. Stems prickly.
Leaves compound, margin toothed; habit scrambling . . . Rosa
Leaves simple, parallel-veined, margin entire; climbing
by paired tendrils Smilax
- DD. Stems not armed.
E. Leaves compound.
F. Leaves palmately compound.
Leaflets 5, entire on the margin; climbs by
twining Akebia
Leaflets 3-5, toothed on the margin; climbs by
tendrils or adhesive discs; pith white . . Ampelopsis
- FF. Leaves pinnately compound.
G. Leaflets three.
Leaflets lobed or stipuled, lobes entire, hairy
on the margin; fruit bean-like Pueraria
Leaflets sparsely and coarsely
toothed; berries white (poisonous). . Rhus radicans
- GG. Leaflets more than 3, short-stalked.
Margin entire Wisteria
Margin toothed Bignonia
- EE. Leaves simple.
H. Leaves palmately veined.
Leaves more or less lobed but not toothed; fruit
with a flattened, curved stone; twining.
Flowers with 6-8 petals and 12-24 stamens;
leaves peltate Menispermum
Flowers with 6 petals and 6 stamens; leaves
not peltate Cocculus
Leaves lobed and toothed.
Pith white; climbs by aerial rootlets and
discs Ampelopsis
Pith brown; climbs by elongated tendrils,
usually forked Vitis
Leaves not lobed nor toothed, - large, thin, ovate,
flowers peculiar pipe-shaped Aristolochia a

HH. Leaves pinnately veined

I. Leaf margin entire

Leaves often hastately lobed or divided

at the base; odor rank when crushed . . . *Solanum*

Leaves not lobed nor divided at the base; flowers and fruits small, in panicles . . . *Polygonum*

II. Leaf margin toothed

Leaves large and coarse; marginal teeth

bristle-tipped, petioles red . . . *Actinidia*

Leaves moderate in size, finely toothed but
not bristle-tipped *Celastrus*

KEY TO THE WOODY CLIMBERS IN WINTER

- A. Stems with prickles
Trailing or scrambling; prickles stout, curved; shoots terete and with a relatively large pith *Rosa*
Climbing by stipular tendrils or twining; prickles slender, black; tendrils also present; shoots angled and without pith, i.e. endogenous as in a cornstalk *Smilax*
- AA. Without prickles
B. Climbing by tendrils or twining petioles.
C. Climbing by tendrils only; tendrils forked, not thickened at tip; leaf scars alternate.
 Hard-wooded, with much-flaking bark; pith brown *Vitis*
 Soft-wooded, with bark not flaking or only slightly so; pith white *Ampelopsis*
- CC. Petioles of leaves twining and assisting; stems strongly angled or ridged; leaves opposite, not disarticulating though dying *Clematis*
- BB. Climbing by aerial rootlets or discs.
D. Leaf scars alternate.
 Leaf scars 2-ranked, rounded, with many bundle traces in an ellipse, and with long, narrow stipule scars; pith white *Ampelopsis*
 Leaf scars not 2-ranked nor rounded.
 Leaf scars U-shaped; buds with about 2 fleshy scales; leaves evergreen *Hedera*
 Leaf scars broadly crescent-shaped or shield-shaped; buds stalked and naked (poisonous) *Rhus*
- DD. Leaf scars opposite.
 Leaves evergreen *Euonymus*
 Leaves deciduous
 Leaf scars shield-shaped, with one C-shaped bundle trace and the buds connected around the twig by a hairy line; stems terete *Bignonia*
 Leaf scars crescent-, U-, or horseshoe-shaped.
 Buds with 4-6 outer scales; leaf scars crescent-shaped with 3 bundle traces *Hydrangea*
 Buds with 2 outer scales; scars U-shaped with 5 bundle traces *Schizophragma*
 Buds with indistinct scales; scars horseshoe-shaped with 3 bundle traces *Decumaria*
- BB. Climbing by twining stems.
E. Leaf scars opposite
 Buds nearly concealed by the leaf base; sap milky . . *Periploca*
 Buds evident.
 Stems warty; leaf scars low, $\frac{1}{2}$ -round, and connected by hairy, transverse ridges, with 1 bundle trace *Bignonia*
 Stems smooth, hairy or glaucous; leaf scars small, crescent-shaped, on the narrowed ends of much-raised bases that are more or less connected by transverse lines, and with 1 bundle trace . . *Lonicera*
- EE. Leaf scars alternate.
F. Buds concealed.
 Buds buried in the thickened cortex or swelling above the leaf scar *Actinidia*
 Buds covered by the leaf scars; fruit with a ringlike or crescent-shaped stone.
 Fruit red, stone transversely ribbed, compressed . . *Cocculus*
 Fruit black, stone curved & crested on back . . *Menispermum*
- FF. Buds evident
 Buds superposed on a silky area in the arch of the U-shaped leaf scar *Aristolochia*
 Buds not as above
 G. Buds with mucronate scales

FF. Buds evident.

Buds superposed on a silky area in the arch of the
U-shaped leaf scar Aristolochia

Buds not as above.

G. Buds with mucronate scales.

Buds small, low, stout, subglobose, held at a
broad angle with the stem above the low leaf

scars, the latter with one bundle trace . . Celastrus

Buds ovoid, with numerous scales, directed
upward above the much raised leaf scars

with 3-6 bundle traces in a broken ellipse. . Akebia

GG. Bud scales not mucronate.

Bark of twigs loose and shredding, not hairy; nodes
very long; buds shrivelled and ragged with

very loose scales Polygonum

Bark firm, not loose nor shredding.

Buds narrowly oblong, acute at tip, and with
a hornlike or wartlike prominence at each
side of the base, giving them the appearance
of insects when held upside down; twigs

striped, not hairy, hard-wooded Wisteria

Buds not as above, twigs soft-wooded.

Twigs hairy and striped; leaf scars compara-
tively large, scarcely raised, with 2

bundle traces and large stipule scars;

buds flattened, thin Pueraria

Twigs not hairy; leaf scars much raised and
with one bundle trace and no stipule scars.

Solanum

ACTINIDIA ARGUTA is recognized thus

- SUMMER : a glabrous, unarmed twiner; leaves alternate, simple, petiolate, broad-ovate to elliptic, pinnately veined, serrate with bristle-tipped teeth; petioles red; flowers dioecious, in cymes or solitary, white, cup-shaped, with purple anthers; fruit a berry.
- WINTER : stems orange-brown, glabrous, with a brownish, chambered pith; leaf-scars alternate, round, rather large, much raised, with one bundle trace and no stipule scars; buds tiny, green, embedded in the cortex or in a swelling above the leaf scar; end-bud lacking.

AKEBIA QUINATA is recognized thus

- SUMMER : a twining vine, unarmed, glabrous; leaves alternate, palmately compound with five leaflets, long-petioled; leaflets oval to oblong, entire, petiolate, rounded both ends or emarginate at the tip; flowers slender-stalked, fragrant, dark red-violet; fruit oblong, usually in pairs, seldom seen in cultivation.

- WINTER : twigs slender, rounded, twining; leaf scars alternate, with 6 or more bundle traces in a broken ellipse, and no stipule scars, half-elliptic, much raised; buds evident, small, sessile, stout, ovoid, pointed, held at a broad angle to the stem, with 10-12 microneate scales, sometimes branching from the axils of the lower scales.

ARISTOLOCHIA SIPHO (syn. *durior*) is recognized thus

- SUMMER : an unarmed twiner; stems greenish, glabrous, somewhat striate; leaves alternate, simple, entire, large kidney-shaped to ovate, thin, palmately veined; flowers pipe-shaped, greenish marked bronze; fruit a 6-ribbed capsule.

- WINTER : unarmed stems terete, green, swollen at the nodes; leaf scars alternate, U-shaped, a little raised, with three bundle traces and no stipule scars; buds evident, superposed on a silvery area in the arch of the U-shaped scar, with few scales, silky.

The Genus AMPLOPSIS is recognized thus (including Parthenocissus)

SUMMER : leaves long-petioled, palmately 3-5 parted or lobed, about as broad as long; stems round or slightly angled and with a firm bark; fruit a berry borne in cymes.

WINTER : woody climbers by means of tendrils or modified tendrils or aerial roots; stems round or slightly angled and with a firm bark; pith white or greenish; leaf scars half-round or nearly circular, with numerous bundle traces arranged in an ellipse; bark firm and close with prominent lenticels.

Summer and Winter Keys combined

Species	tendrils	leaves	cymes	young branchlets	leaflets	buds	fall color
aconitifolia	without adhesive discs	5-parted	glabrous, fruit orange or yellow	lanceolate	small, with several outer scales	no change	
heterophylla	"	simple, 3-lobed	on pilose stalks, vari-colored	hairy	broadly ovate	"	
quinquefolia	with 5-12 branches with adhesive discs, tendrils and internodes long	5-parted	crowded into round terminal panicles	green	rounded, not large; with 2-4 outer scales	vivid hues	
henryana	"	"	"	square	with white markings, purplish below	"	
tricuspidata	5-12 adhesive discs, tendrils and internodes short	3-lobed	on short simple or 2-leaved branchlets	squarish	green, purplish below	"	

N.B. varieties of quinquefolia and of tricuspidata are distinguished from the type by their foliage, viz.—
quinquefolia engelmannii — leaves smaller and more dense.
tricuspidata lowii — leaves small, much curled
tricuspidata veitchii — leaves lobed, not divided.

ARISTOLOCHIA SYPHO — see preceding page.

AMPELOPSIS — ARISTOLOCHIA

The Genus **BIGNONIA** is recognized thus

Summer : a vine climbing by aerial rootlets; leaves opposite, pinnately compound; leaflets serrate, short-stalked, elliptic to ovate-oblong, acuminate, cuneate; flowers orange to scarlet, in terminal cymes or panicles, showy and conspicuous; corolla tubular-funnel form, with five rounded lobes; fruit a thick, almost bean-like pod which opens to disclose numerous winged seeds flattened about a central partition.

WINTER : a woody vine climbing by aerial rootlets; stems rounded, warty; leaf scars opposite, shield-shaped, low, with one C-shaped, compound bundle trace and no stipule scars but connected around the twig by hairy transverse ridges; buds rather small, usually solitary, sessile, triangular, compressed, ascending, with 2-3 pairs of outer scales.

Summer and Winter Keys combined

species	leaflets	mode of climbing	floral color	capsule	twig
radicans	pubescent beneath	by twining and by aerial rootlets	orange	apex beaked	puberulous
grandifloraglabrous	—	twining; has few or no aerial rootlets	scarlet	apex obtuse	glabrous

The Genus **CELASTRUS** is recognized thus

SUMMER : leaves alternate, petiolate, serrate, with small stipules; flowers in axillary cymes or terminal panicles, polygamomo dioecious, small, greenish, inconspicuous; fruit a yellow or orange capsule, dehiscent in 3 valves, disclosing a fleshy crimson aril.

WINTER : Twigs moderate, twining; pith white, relatively large; leaf scars alternate, half-elliptic, low, with one transverse bundle trace and with very minute stipule scars or sometimes with the stipules remaining as tufted hairs; buds small, sessile, solitary, subglobose, with about 6 hard, mucronate scales.

Summer and Winter Keys combined

species	flower and fruit clusters	leaves	fruit color	branches	scars
scandens	terminal	ovate	orange-red	lenticels scarcely noticeable	shield-shaped
orbiculatus	axillary	sub-orbicular, oblong or obovate	orange-yellow	lenticels very prominent	half-elliptical transversely

The Genus **CLEMATIS** is recognized thus

SUMMER : leaves opposite, usually compound, rarely simple; flowers apetalous, sepals petaloid, stamens numerous, carpels many, becoming one-seeded achenes with a persistent, plumose style.
WINTER : soft-wooded climbers with much angled or ridged stems, the ridges being over the vascular bundles and having a cavity in the cortex under the ridges; pith angled, white; leaf petioles persistent, not disarticulating though dying, and prehensile (i.e. serving the function of climbing tendrils), without stipules or stipule scars; buds small, with 1-3 pairs of outer, rather hairy scales.

Summer and Winter Keys combined

species	stems	stem color	flowers	twigs	sepals	leaflets
paniculata	12-18 ridged	straw-colored	monoecious			entire, or occasionally lobed
virginiana	6 primary ridges stronger	brown	dioecious	finely pubescent		ovate, variously few-toothed or coarsely dentate
lawsoniana	"	"	monoecious	"		ovate-lanceolate, acuminate, simple or with three overlapping leaflets
henryi	"	"	"	"		ovate, acute, ternate or pinnate
jackmanni	"	"	glabrate	4-6 obovate		

COCCULUS CAROLINUS is recognized thus

SUMMER : an unarmed climber with pubescent branchlets; leaves alternate, simple, palmately veined, entire or shallowly 3-5 lobed, orbicular to triangular-ovate, obtuse and mucronulate at the tip, rounded at the base, pubescent and glaucous beneath, glabrous above, rather long petioled; flowers dioecious, small, in short or sometimes spike-like panicles, with six petals and six stamens; fruit subglobose, red drupes with the stones curved, compressed, and transversely ridged.

WINTER : stems greenish to tan, twining, fluted, slender, terete; leaf scars alternate, elliptical, raised, concave, with 3-7 bundle traces and no stipule scars; buds small, hairy, superposed, the upper developing inflorescence, the lower covered by the leaf scars, with about three indistinct scales.

DECUMARIA BARBARA is recognized thus

SUMMER : a deciduous or sub-evergreen climber by aerial rootlets; bark peeling; leaves opposite, petiolate, ovate to elliptic, entire or sparsely toothed, acute, glabrous, estipulate, lustrous above; flowers in rounded, terminal corymbs, white, small; fruit an urn-shaped capsule, ribbed between the seeds.

WINTER : climbing by aerial rootlets; stems slender, round, exfoliating; pith greenish; leaf scars opposite, horseshoe-shaped, raised, concave, connected by a line around the twig, with three bundle traces and no stipule scars.

COCCULUS -- **CLEMATIS** -- **DECUMARIA**

The Genus *LONICERA* is recognized thus

SUMMER : twining, woody vines; leaves opposite, short-petioled or sessile, entire, sometimes connate, without stipules; flowers short-pedicelled in axillary pairs or in sessile terminal whorls; fruit a berry.

WINTER : woody vine which climbs by twining; subevergreen; twigs rounded, slender; leaf scars opposite, crescent-shaped, small, on the extremities of raised bases which are more or less connected by lines around the twig, with three bundle traces and no stipule scars; buds often superposed, the lowermost largest and developing inflorescence, sessile, with 2 to numerous 4-ranked scales.

Summer and Winter Keys combined

species	leaf color	leaves	flowers	fruits	stems
Japonica	deep rich green	oval	white to yellow	black	pubescent, grayish
sempervirens	blue-green, glaucous	ovate and connate	trumpet-shaped, outside, yellow	red within	glabrous, yellowish

MENISPERMUM CANADENSE is recognized thus

SUMMER : a twiner with a persistent root and woody base but the upper growth less persistent; young growth pubescent; leaves orbicular, the petiole attached inside the margin, long-petioled, entire or shallowly 3-7 lobed, acute or obtuse, glabrescent; flowers small in loose panicles, not peduncled; fruit a subglobose drupe, blue-black, with a crescent-shaped stone crested on the back.

WINTER : semi-woody twiner; twigs round, fluted, slender, with a relatively large, white pith; leaf scars alternate, elliptical, concave on the face, and raised at the edges, with 3-7 bundle traces and no stipule scars; buds small, hairy, superposed, with the uppermost developing inflorescence and the lower covered by the leaf scar, with about 3 indistinct scales; fruit sometimes persisting, with a crescent-shaped stone crested on the back.

PERILOCA GRAECA may be recognized thus

SUMMER : a strong climber with glabrescent twigs; leaves opposite, ovate or elliptic to oblong-lanceolate, long acuminate, lustrous, entire; flowers in axillary or terminal cymes, greenish-yellow outside, purplish within; calyx glandular inside; fruit of two cylindric follicles cohering at the apex.

WINTER : a soft-wooded climber; sap milky; stems terete, twining; pith excavated; leaf scars opposite, raised, shrivelled or elliptical, with one crescent-shaped bundle trace and no stipule scars; buds small, solitary, almost concealed by the much raised leaf bases.

LONICERA -- *MENISPERMUM* -- *PERILOCA*

PARTHENOCISSUS -- see Ampelopsis

The Genus POLYGONUM is distinguished thus

SUMMER : Leaves with tubular or sheath-like stipules, alternate, simple, ovate, entire, pinnately veined, lustrous, slender-petioled; flowers small, in racemes collected into small panicles, white or pinkish, showy because so profuse; fruit a small achene, triangular, enclosed by the persistent perianth.

WINTER : unarmed, twining woody climbers with jointed stems; bark loose and shredding; nodes very long; stems glabrous, green striped, slender, often dying back at the top; leaf scars alternate, crescent-shaped, narrow, with 3 bundle traces and narrow-linear stipule scars connected by a line around the twig; buds evident, shrivelled and ragged with thin, very loose scales; fruit more or less persistent, a small, triangular achene enclosed by 3 bracts and borne in racemes or panicles.

species	inflorescence	floral color	fruit
auberti	erect, minutely scabrous-pubescent	white	scarce or lacking
baldschuanicum	drooping, nearly glabrous	pinkish	profuse, large

PUERARIA THUNBERGLIANA is recognized thus

SUMMER : a twining, high-climbing, unarmed vine of very rapid growth; root a fleshy tuber; leaves alternate, pinnately compound, 3-parted, stipulate; leaflets large, often lobed, stipellate, margin entire, hairy; flowers blue-violet, pea-like, in long dense, axillary racemes; bracts and bractlets small, soon dropping; fruit an elongated, 2-valved, bean-like pod.

WINTER : bark firm, branchlets striped, soft-wooded, hairy, dying back to the base in winter, inter-nodes long; root persistent, fleshy, tuberous; leaf scars alternate, scarcely raised, comparatively large, with 2 bundle traces and large stipule scars; buds flattened, thin, scales obtuse or acute.

SCHIZOPHRAGMIA HYDRANGEOIDES is recognized thus

SUMMER : a vine climbing by aerial rootlets; bark of the older branches with longitudinal fissures, opposite, long-petioled, broadly ovate, sparsely and coarsely dentate, short-acuminate, cordate, nearly glabrous, estipulate; flowers small, whitish, in loose, peduncled corymbs margined with sterile flowers having a single large white sepal; fruit a conical, ribbed capsule containing many seeds.

WINTER : stems brown, rather slender; bark finally splitting longitudinally and peeling; leaf scars smallish, developing into short spurs, solitary, with 2-4 outer scales which are golden-brown, pubescent, and inclined to be ciliate; end-bud somewhat enlarged.

PARTHENOCISSUS --

SCHIZOPHRAGMIA --

The Genus SMILAX is recognized thus

SUMMER : woody climbers with paired tendrils on the base of the petiole; those on the list given below all having distinct but narrow stipules with tendrils; stems often prickly, little branched at the base; lower leaves much reduced, upper leaves entire or sometimes slightly 3-lobed, with parallel veination; flowers dioecious, small, inconspicuous, in axillary umbels; fruit a small, black berry with 1-to several seeds.

WINTER : a vine climbing by tendrils, armed with straight, often strong prickles; stems terete or angular, the woody fibers embedded in the pithy stalk as in a cornstalk i.e. endogenous; leaves tearing away above the clasping base, thus leaving no definite scar but carrying 10-12 vascular bundles, the stipules or their equivalent persisting as tendrils on these leaf bases; buds triangular, pointed, widely divergent, with one bud-scale, enclosed in the remnant of the leaf base.

Summer Key

species	leaves	fruits	peduncles	fruit seeds
glauca	very glaucous below	bloomy	much longer than petioles	3-seeded
hispida	glabrous or glabrescent	not bloomy	"	1-seeded
rotundifolia	"	not bloomy, lustrous	shorter than petioles	3-seeded

Winter Key

species	stems	stem color	prickles
glauca	glaucous	brownish	few
hispida	not glaucous	green	stout, flattened at base, dense below
rotundifolia	not glaucous	green	needle-like, black, few

SOLANUM DULCIMARA is recognized thus

SUMMER : a scrambling shrub; branches sometimes spiny; leaves alternate, simple or compound, ovate to ovate-oblong, entire, lobed at the base, acuminate, cordate, puberulent, petiole short to moderate; flowers in cymes, rarely solitary, shallow-bell-shaped, with connivent anthers like a potato blossom; fruit an ovoid, scarlet berry in drooping clusters. Fruits are said to be poisonous.

WINTER : a soft-wooded scrambler, slightly inclined to twine; stems slender, somewhat angular or terete, pith large, greenish, spongy; leaf scars alternate, $\frac{1}{2}$ -round, much raised, with one rather large bundle trace and no stipule scars; buds subglobose, small, solitary, sessile, with 4 hairy, obtuse outer scales; vestiges of fruit clusters often remaining, opposite the leaf scars or beside the axils.

The Genus *VITIS* is recognized thus

SUMMER : Woody vines climbing by means of tendrils; pith brown, usually interrupted at the nodes by diaphragms; leaves alternate, simple, coarsely dentate, usually lobed; flowers in panicles opposite the leaves; fruit a pulpy 2-4 seeded berry borne in dense panicles.

Summer Key

species	basal sinus of leaves	under side of leaves	leaf form	tomentum	tendrils	branchlets
<i>cordifolia</i>	narrow; leaves ovate, undivided or slightly 3-lobed	green and glabrous or slightly pubescent				terete, glabrous
<i>vulpina</i>	wide; leaves broader	"				
<i>aestivalis</i>	lobes often overlapping	floccose *	deeply lobed with round sinuses	flocculent or cobwebby or glaucous below	intermittent**	terete
<i>coignettiae</i>	indistinct	"	not or indistinctly lobed	brownish floccose	"	"
<i>cinernea</i>	open, wide	"	"	grayish floccose	"	
<i>labrusca</i>	open	densely and persistently brown tomentose	slightly 3-lobed	brown, dense continuous***	angled	terete

* with bunches of soft hair or wool

** often skipping a node

*** one at each node

VITIS -- Summer Key

The Genus VITIS is recognized thus
 WINTER : woody climbers with forked tendrils opposite the leaf scars; bark shredding in long strips,
 without lenticels; pith brown; twigs striate or angled; leaf scars alternate, 2-ranked,
 half-round or crescent-shaped, with several bundle traces arranged in a C and with long,
 narrow stipule scars; buds subglobose, with two broad scales, laterally branching;
 end-bud lacking.

Winter Key

species	twig bark	twigs	tendrils	nodal diaphragms	fruit panicles
cinernea	gray woolly	distinctly angled	intermittent		
coignetiae	brown woolly	distinctly angled	intermittent		
laurusca		nearly terete	continuous *		
vulpina	"	"	intermittent **	thin	
cordifolia	"	"	"	thick	vestiges open and large
aestivalis	brown floccose	"	"	"	vestiges compactly branched

* one at each node
 ** often skipping a node

The Genus *WISTERIA* is recognized thus

SUMMER : woody twiners; leaves pinnately compound, with 9-19 leaflets with stipules soon falling, alternate; leaflets shortly petioled, alternate, stipellate; flowers light purplish or white, pea-like, in long racemes, the flowers opening from base to apex gradually; fruit an elongated bean-like pod, somewhat contracted at intervals.

WINTER : woody vines which climb by twining; stems moderate, slightly fluted; leaf scars alternate, transversely elliptical, much raised, and with a horn- or wart-like protuberance on each side at the base, so that bud and scar together have the appearance of an insect when viewed upside down, with one bundle trace and no stipule scars; buds medium to medium-large, solitary, sessile, narrowly oblong and acute at the tip and nearly surrounded by the outer scale.

Summer and Winter Keys combined

N.B. Wisteria species are difficult to distinguish in winter, but possible if one have fruits as well as twigs.

species	leaflets	branchlets	fruit pods	flower clusters
<i>floribunda</i>	13-19	slightly pubescent	velvety, 10-15 cm. long, narrowed near the base	very long
<i>frutescens</i>	usually fewer, 9-13	glabrous or nearly so	glabrous, 5-10 cm. long, compressed	racemes 4-5" or less in length
<i>sinensis</i>	"	pubescent	10-15 cm. long, densely velutinous, 1-3 seeded	racemes 6-12" or more in length

KEY TO THE HARDY BROAD-LEAVED EVERGREENS

- A. Climbing by aerial rootlets.
Branchlets terete; leaves alternate, lobed or broadly ovate,
margin entire Hedera
Branchlets square or 4-angled; leaves opposite, ovate to obovate
or narrow-elliptic, margin toothed Euonymus
- AA Not climbing.
B. Leaves whorled.
Leaves small, linear, revolute, regularly whorled Erica
Leaves larger, oblong-obovate, serrate, in irregular
whorls Chimaphila
- BB. Leaves opposite.
Leaves scalelike, 4-ranked, keeled, auricled at the base;
corolla 4-parted, persistent; flowers in terminal
spikes Calluna
Leaves ordinary, not scalelike.
- C. Leaf margin entire.
Habit prostrate Vinca
Habit erect.
D. Branchlets square; leaves ovate to oblong; buds
with several scales Buxus
- DD. Branchlets terete; leaves oblong to elliptic,
revolute, not dotted; buds with two outer
scales Kalmia
- CC. Leaf margin serrate or serrulate.
Branchlets square or 4-angled.
With very small linear or narrow-oblong leaves, somewhat
revolute and finely serrate above the middle Pachistema
With broader, lustrous leaves, ovate to obovate or
narrow-elliptic Euonymus
Branches terete and tomentose; leaves large and strongly
wrinkled, and tomentose beneath Viburnum
(see shrub keys)
- BBB. Leaves alternate.
E. Leaves pinnately compound.
Prostrate half-evergreen, armed with strong prickles . . . Rosa
Erect, evergreen, unarmed; leaves spinose-dentate . . Mahonia
- EE. Leaves simple.
Leaf margins sinuately spiny; some leaves 3-foliate . .
Berberis
Leaves not as above.
A low plant with obovate leaves 3-nerved at the
base and dentate Pachysandra
Leaves not obovate or not 3-nerved at the base.
Branches thorny Pyracantha
Branches not thorny.
- F. Habit prostrate, creeping or trailing.
Leaves and stems bristly with rusty hairs;
leaves oval, rounded or heart-shaped;
flowers salverform in terminal clusters,
very fragrant Epigaea
- Not as above
Stems creeping on or below the surface
sending up sparse erect branches
with a few leaves at the tip; leaves
glossy dark green, obscurely serrate
and with a spicy-aromatic flavor . . Gaultheria
- Stems trailing; leaves with margin entire
and without the spicy-aromatic flavor.
Leaves narrow, oblanceolate, glaucous
beneath, with a sharp-pointed tip;
branches pubescent Daphne
- Leaves broader, obovate-oblong, thick,
with finely impressed veins, wedge-

shaped at the base, and with
the tip obtuse or retuse; bark
exfoliating *Arctostaphylos*

FF. Habit erect.
Leaves fragrant when crushed, slightly
rugose above, and densely brown-
tomentose beneath, tip very obtuse . *Ledum*
Not as above.
G. Leaves toothed on the margin.
Leaf margins with spiny teeth *Ilex*
Marginal teeth not spiny, margins
serrulate or obscurely toothed.
Leaves glandular black-dotted beneath
Pieris
Not glandular beneath.
Leaves covered with scurfy scales
beneath; margin obscurely
denticulate *Chamaedaphne*
Leaves not scurfy-scaly beneath,
conspicuously petiolate, broadly
lanceolate, acuminate; marginal
teeth bristle-tipped . . . *Leucothoe*

GG. Margins entire.
Leaves linear and revolute *Andromeda*
Leaves not linear.
H. Leaves lighter beneath.
Under side yellowish; leaves
cuneate and revolute . . . *Kalmia*
Under side whitish; leaves ellip-
tic to oblong.
Evergreen *Rhododendron*
Deciduous *Azalea*

HH. Leaves green beneath or hairy,
rounded or oval *Cotoneaster*
(see deciduous shrubs)

The Genus AZALEA is recognized thus
SUMMER : upright shrubs; leaves alternate, short-petioled, entire or ciliate; flowers from leafless
terminal or lateral buds; lateral buds clustered at the ends of branchlets; corolla funnel-
form; stamens 5-10, more or less exerted; fruit a capsule.

species	flowering season	foliage	young bark	branchlets	under side of leaves	corolla tube	twigs	corolla	shape of leaves	upper side of leaves
amoena	before the leaves (obtusum)	sub-evergreen	with flat chaff-like scales rather than hairs			shorter than the lobes			obtuse	
mucronulatum	"	"	"	glabrate	pale with scattered glands		glab-rate	puberulous	broadest near base acute	
kaempferi	"	deciduous, thin	"			shorter than the lobes				
Japonicum	"	"	not chaffy-scaled, but pubescent or glandular	glabrous	bristly on veins	"				
(canescens) roseum	"	"	"	finely pubescent	gray-pubescent	"				
nudiflorum	"	"	"	pubescent	glabrous as long as or longer than the lobes					
vaseyi	"	"	"	puberulous	"	shorter than the lobes				
arboreo-with or after the leaves	"	"	"	glabrous	as long as or longer than the lobes	glabrous	white	broadest near tip	gla-Brous	
viscosum	"	"	"	with stiff appressed hairs	hairy appressed bristles on midrib	"	hairy & sticky	usually white, viscid & glandular	"	"
calendulaeum	"	"	"	pubescent	"	pubescent	fiery red	"	finely pubescent	
canadense *	"	"	"	puberulous, hairy, often bloomy	shorter than the lobes	puberulous	rose purple	broadest at middle	slight-ly pubescent	

*Rhodora canadense
Although deciduous, Azalea is placed in this section because of its very close relation to Rhododendron

AZALEA -- Summer Key

The HARDY AZALEAS are recognized thus

WINTER : erect shrubs with deciduous leaves; twigs moderate, terete; pith rather small, slightly colored, continuous; buds solitary, sessile, clustered above tufts causing the branches to cluster, near the end of the season's growth; upper buds enlarged, ovoid, with about 6 ciliate scales; flower buds still larger; lower buds increasingly smaller and with fewer scales; leaf scars alternate, low, shield-shaped, notched or straight at the top, with one bundle trace and no stipule scars; fruit often persistent, oblong, 5-valved capsules.

N.B. See key to Rhododendron

species	foliage	twigs	leaf scars	pedicels	flower buds	branchlets	buds	capsules	bud color
<i>amoena</i>	sub-(obtusum) evergreen	with flat, chaff-like scales rather than hair	"	"	"	"	"	"	"
<i>kaempferi</i>	deciduous, thin	"	"	"	"	"	"	"	"
<i>mucronulatum</i>	"	"	low	"	"	"	"	"	"
<i>vaseyi</i>	"	not chaffy-scaly but pubescent or glandular	raised scarcely notched not raised	"	"	"	"	"	"
<i>japonicum</i>	"	"	"	"	"	"	"	"	"
<i>canadense</i>	"	"	"	"	"	"	"	"	"
<i>roseum</i>	"	"	"	"	"	"	"	"	"
<i>arborescens</i>	"	"	"	"	"	"	"	"	"
<i>viscosum</i>	"	"	"	"	"	"	"	"	"
<i>nudiflorum</i>	"	"	"	"	"	"	"	"	"
<i>calendulaceum</i>	"	"	"	"	"	"	"	"	"

The Genus *BUXUS* is recognized thus
evergreen shrubs or small trees; twigs slender, green, flat-grooved between each pair of leaves;
leaves opposite, small, leathery, almost elliptical, entire, short-petioled, glabrous, with one
main vein; buds sessile, solitary, small, ovoid, with 2-4 scales; flower-buds larger and multiple;
leaf scars minute, raised, crescent-shaped, with one bundle trace and no stipule scars; flowers small,
inconspicuous, in axillary or terminal clusters; fruit an ovoid, 3-horned capsule with two lustrous
black seeds.

species	variety	leaves	branchlets	flowers	habit
<i>sempervirens</i>		elliptic to lance-oblong; broadest at or below the middle	usually a little pubescent	axillary clusters	
<i>myrtifolia</i>		small, elliptic-oblong			low
<i>microphylla</i>		obovate to oblong-obovate broadest above the middle	usually glabrous	mostly terminal	
<i>koreana</i>		obovate, emarginate, pubescent on the midrib above	softly pilose	axillary and terminal	

CALLUNA VULGARIS is recognized thus
a small evergreen shrub; leaves opposite, scalelike, 4-ranked, keeled, sessile, auricled at the base;
oblong-ovate, puberulous or nearly glabrous; flowers pink in dense racemes or terminal spikes, corolla
4-parted, persistent; fruit a 4-valved capsule; twigs very slender, rounded, small, globose and angular, with about 3 outer scales.

CHAMAEDAPHNE CALYCULATA is recognized thus
A low erect shrub with numerous spreading branches, bushy and unarmed; leaves alternate, simple, obovate to oblong, scurfy, short-petioled, revolute, obscurely toothed or nearly entire, with one main vein; flowers white, short-pedicelled, in terminal, nodding, leafy racemes on the under side of the branches; fruit a dehiscent capsule; twigs slender, with a shredding gray bark, finally smooth, reddish brown.

CHIMAPHILA UMBELLATA is recognized thus
a small, low-growing, half-shrubby or herbaceous plant with long, running underground stems sending up leafy shoots tufted with leaves at the top; leaves whorled, moderate size, oblong-ovate, serrate, short-petioled, thick and shining; flowers in nodding, terminal, stalked clusters, white or reddish, fruit a globose capsule.

The Genus DAPHNE is recognized thus

Evergreen or deciduous shrubs; winter buds with several outer scales; leaves alternate, rarely opposite, short-petioled, entire, simple, narrow, oblanceolate, with one main vein, acute, glaucous-brown beneath; flowers perfect, apetalous, with bracts; calyx tube campanulate to cylindric, usually 4-lobed, corolla-like, usually pubescent on the outside; stamens 6-10 in two rows, included; stigma capitate, sessile, or on a short style; ovary without disk at the base, or a ringlike disk, or one entire scale; fruit a leathery or fleshy one-seeded drupe.

species	leaves	corolla	habit	flowers
mezereum	deciduous, alternatesilky-pubescent glabrous	erect to 3' or 4'		axillary along old wood
neorium	evergreen densely pubescent outside	low or procumbent 1' to 1½'		in terminal heads

EPIGAEA REPENS is recognized thus

a prostrate plant, carpeting the ground; leaves and stems bristly with rusty hairs; twigs slender; petioled; leaves alternate, simple, oval to elliptical-ovate, with one main vein, entire and ciliate, short-globular, splitting into a 5-parted rosette with a fleshy, berry-like interior.

The Genus *ERICA* is recognized thus
a low, spreading shrub, often forming matlike growths; leaves small, linear, revolute, petiolate, regularly whorled, mostly longer than the internodes of the very slender stems; flowers pink or white, in terminal spikes or panicles; fruit a 4-valved capsule, ovoid or subglobose, enclosed in the persistent corolla.

species	anthers	leaves and calyx tubes	branchlets	inflorescence	location of anthers	sepals	sepal form	leaves
tetralix	appendaged	conspicuously ciliate	minutely villosular hirsute	terminal umbel-like				
ciliaris	not appendaged	"	densely pubescent	terminal spikes				
cineraria	appendaged	Glabrous	finely pubescent	terminal racemes or panicles				
scoparius	not appendaged	"	glabrous	axillary cylindric spikes	included in corolla tube			
vagans	"	"	"	lateral	exserted	less than $\frac{1}{2}$ as long as the corolla	ovate	
carnea	"	"	"	axillary, forming terminal racemes	"	more than $\frac{1}{2}$ long as corolla	lanceolate	

GAULTHERIA PROCUMBENS is recognized thus
a low, tufted, spreading plant with a procumbent stem, spreading by creeping roots; leaves alternate, simple, oval, entire, with a spicy-aromatic flavor, glossy deep green, with one main vein, obscurely serrate, glabrous, short-petiolate; flowers axillary, urn-shaped, nodding, pinkish-white; fruit a bright red, spicy-flavored berry, nearly globular, slightly 5-lobed at the top.

HEDERA HELIX is recognized thus
a vine creeping or climbing by small rootlets at the nodes; branchlets terete, nodes long; leaves alternate, lobed or broadly ovate, margin entire; flowers in globose umbels terminal on high-climbing branches, inconspicuous; fruit a 3-5 seeded drupe, black, and berrylike, not formed in northern states.

The Genus ILEX is recognized thus

evergreen or deciduous shrubs or trees; leaves alternate, simple, moderate in size, estipular, lenticular, odorless, often spiny-toothed; twigs smooth dark gray marked lighter gray, usually superposed, with 2-6 outer scales; flowers solitary and axillary or fascicled in cymes, 4-merous; fruit a small drupe with several bony nutlets; leaf scars crescent-shaped, raised, clustered near ends of twigs but with longer internodes on older growth, with one bundle trace and minute stipule scars or persistent stipules.

species	leaves	flowers and fruits	fruit color	leaf margin	flowers	
<i>Verticillata</i>	deciduous					leaf apex
<i>aquifolium</i>	evergreen axillary on last year's branchlets, usually clustered			spiny with large triangular teeth		
<i>opaca</i>	"	solitary or in clusters peduncled axillary on young branchlets	red	coarsely spiny-toothed		
<i>glabra</i>	"	"	black	with few obtuse teeth near apex or entire	5-8-merous	obtuse
<i>crenata</i>	"	"	"	serrate or crenate, only a few teeth near the apex	4-merous	sharp-pointed

The Genus KALMIA is distinguished thus

evergreen undershrubs, poisonous in all parts; twigs moderate, gray; leaf scars clustered on new growth but with longer internodes on older wood, shield-shaped, with a linear bundle trace and no stipule scars; buds with two outer scales; leaves alternate, opposite or whorled, peltate, saucer-shaped with ten small pouches which hold the anthers bent over into them, the latter springing up suddenly to discharge pollen when touched; fruit a 5-valved dehiscent capsule containing numerous minute seeds.

species	arrangement	leaf tip	leaves	inflorescence	pod	flowers
<i>latifolia</i>	mostly alternate	acute	distinctly petioled	compound (corymbs)	depressed glandular	terminal
<i>angustifolia</i>	opposite or in 3's	obtuse	short-petioled	compound	depressed, nearly smooth	lateral
<i>polifolia</i>	"	"	sessile or nearly so	simple umbels	ovoid smooth	terminal

LEDUM GROENLANDICUM is recognized thus
a dwarf evergreen shrub twigs rusty-tomentose, slightly triangular; leaves alternate, simple, oblong
entire, revolute, fragrant when crushed, slightly rugose above, densely brown tomentose beneath;
leaf scars minute, slightly raised, triangular, with one bundle trace and no stipule scars; buds small,
solitary, sessile, conical or globose, with 2-3 outer scales; flowers white in largish terminal umbel-
like clusters, showy, puberulous; fruit an oblong capsule, more or less persistent.

LEUCOTHOE CATESBAEI is recognized thus

An arching under-shrub; twigs reddish and puberulous when young; leaves alternate, simple, lanceolate,
lustrous, leathery, slightly spinulose-toothed, short-petioled, lighter on the under side, acuminate;
leaf scars small, crescent-shaped, scarcely raised, with one bundle trace and no stipule scars; buds
small, globose, solitary, sessile, with 3-4 outer scales; end-bud lacking; flowers white, rarely pink,
in sprays or loose axillary racemes drooping below the branches, very fragrant; fruit a subglobose
5-lobed capsule, often persistent.

MAHONIA AQUIFOLIUM is recognized thus

an erect unarmed shrub; twigs smooth, slightly glaucous, rather stout; leaves alternate, pinnately
compound, spineo-dentate; leaflets 5-9, ovate to oblong-ovate, stiff and leathery; leaf scars narrow,
low, half-encircling the twig, with numerous bundle traces and no stipule scars; buds smallish with
about 6 outer scales; terminal bud enlarged; flowers yellow racemose, in showy terminal masses; fruit
a small, glaucous, blue berry.

PACHISTIMA CANBYI is recognized thus

a low shrub; twigs square or 4-angled, inclined to be warty; bark becoming rather corky and checked; leaves opposite, small, linear or narrow-oblong, somewhat revolute, serrulate above the middle, short-petioled; leaf scars minute, crescent-shaped, slightly raised, with one indistinct bundle trace and no stipule scars; buds solitary, sessile, ovoid, appressed, very small, with 2 outer scales; flowers small, axillary, 4-merous, in few-flowered cymes; fruit a 2-valved capsule.

PACHYSANDRA TERMINALIS is recognized thus

evergreen, procumbent plants with fleshy stems and matted creeping rootstalks; glabrous; leaves tufted at the top of the short stems, alternate, simple, obovate, coarsely dentate, acute, cuneate, 3-nerved at the base; flowers tiny, whitish, in inconspicuous terminal spikes; fruit a 3-horned whitish drupe.

PYRACANTHA COCCINEA is recognized thus

a low, horizontally spreading shrub of very irregular outline, armed with slender, spreading, purple spines; buds small, sessile, solitary or laterally branched in spine formation, broadly ovoid, pubescent, with about 6 outer pointed scales; leaves alternate, simple, narrow-elliptic to lanceolate to oblanceolate, acute, cuneate, toothed or entire, short-petioled, glabrous; leaf scars crescent-shaped or 3-lobed, with three bundle traces and minute stipule scars; flowers white in compound corymbs; fruit a small pome with a persistent calyx, subglobose, orange-red.

The variety *LALANDI* is more vigorous in growth, has more slender branches, the leaves more deeply notched, and the orange-red fruits more profusely produced.

The variety *ROYALI* is almost identical with *lalandi* except in hardness. It is said to withstand a temperature twenty degrees below zero.

The Genus PIERIS is recognized thus
 twigs rather slender, 3-sided becoming terete; leaves alternate, simple, short-petioled, entire and
 revolute or serrulate; leaf scars small, half-round or triangular, somewhat raised, with one bundle
 trace and no stipule scars; buds small, ovoid to conical, with 2-5 outer scales; end-bud lacking;
 flowers in terminal panicles, 5-merous; fruit a small, globose or urn-shaped dehiscent capsule.

species	branchlets	flower-clusters	inflorescence	leaves
floribunda	bristly-hairy	upright	terminal panicles	acute, obtuse at the base
Japonica	glabrous	drooping	terminal panicles	acute, obtuse at the base
mariana *	glabrous	nodding	axillary fascicles forming terminal leafless racemes (racemose fascicles)	obtuse, base cuneate

* syn. *Lyonia mariana*

The Genus RHODODENDRON is recognized thus
 shrubs, rarely trees; buds with overlapping scales; leaves evergreen, alternate, large, petiolate,
 entire; flowers colorful, in terminal, umbel-like clusters or racemes, sometimes solitary
 or few, rarely from lateral buds, pedicelled; calyx usually 5-parted; corolla a little
 irregular, 5-parted or more; stamens 5-10, anthers opening at the tip; capsule ovoid to oblong,
 opening between the cells; seeds minute, numerous.

Rhododendrons are so numerously hybridized as to be embarrassing to the student. To give a record that would
 be anywhere near complete is manifestly impossible in the scope of this key, nor we do consider it
 desirable at this time. Only the more important hardy native species available for landscape use are here
 given.

As distinguished from Azaleas, the Rhododendrons have leathery, persistent leaves, 10 stamens rarely
 projecting beyond the corolla; leaves alternate, simple, entire; plant unarmed.

RHODODENDRON -- leaves evergreen, leathery, persistent; corolla campanulate; stamens and style rarely exserted,
 AZALEA leaves deciduous, glandular mucronate; corolla funneliform; stamens and style more or less
 exserted.

species	foliage	leaf tip	pedicels	leaves
maximum	evergreen	acute	viscid	acute, 4-10" long, thinly scurfy-tomentose, rarely glabrous
catawbiense	evergreen	rounded	rusty-downy	obtuse or obtusish, 3-5" long, glabrous, pale on the under side

VINCA MINOR is distinguished thus
 an evergreen, trailing subshrub, rooting at the nodes; leaves opposite, 4-ranked, ovate, lobed on the
 immature growth, entire, stipulate, dark green, the veins whitening effectively in winter; flowers
 violet-blue, the corolla salverform; stamens fastened to the middle of the corolla tube; fruit of
 two dehiscent, cylindric follicles.

CONIFER GENERA

Genus	character	leaf arrangement	leaves	leaf blade	leaf base	branchlets	winter buds	fruits
<i>Taxodium</i> Bald Cypress	deciduous spreading in 2 ranks or rows							
<i>Larix</i> Tamarack or Larch	" clustered on short spurs							
<i>Cedrus</i> Cedar	evergreen clustered on spurs or alternate	fascicled on spurs	fascicled in a membranous sheath	4-sided or 4-grooved	terete			
<i>Pinus</i> Pine	" not clustered on spurs	"	not fascicled, scattered	4-sided, sessile	persistent, not recurrent			
<i>Picea</i> Spruce	" "	"	not fascicled, appearing 2-ranked by twist in stalk	4-sided, sessile	flattened, recurrent			
<i>Taxus</i> Yew	" "	"	not fascicled, appearing 2-ranked by twist in stalk	4-sided, sessile	flattened, recurrent			
<i>Tsuga</i> Hemlock	" "	"	not soft	petiolate, stomatica above	flattened, not petiolate, stomatica above	with prominent leaf cushions	yellowish	
<i>Pseudotsuga</i> Douglas Fir	" "	"	appearing 2-ranked, soft & flexible	"	"	smooth, with oval leaf scars	not resinous	
<i>Abies</i> Fir	" "	"	flattened, sessile, stomatica above	"	"	smooth, with pointed, resinous	obtuse, resinous	
<i>Sciadopitys</i> Umbrella Pine	whorled at end of branches		deeply grooved both sides					
<i>Chamaecyparis</i> Retinospora	" opposite or whorled, in 4 rows	usually scale-like	with white markings on under side	a little flat, compressed			with 2-3 seeds under each cone scale	
<i>Thuja</i> Arborvitae	" "	"	as above & glandular	very flat, in one plane			not as above	
<i>Cupressus</i> Cypress	" "	usually scale-like and minutely toothed	with white markings on under side	round or square			with 4 or more seeds to each cone scale	
<i>Juniperus</i> Juniper	" "	awl-like or scalelike	with white markings on upper surface	round or square	not in one plane, not fanlike		a berry	

The Genus *ABIES* is distinguished thus

Leaves scattered, sessile, linear, flat and grooved or quadrangular, and appearing 2-ranked; leaf base not persistent; winter buds obtuse and resinous.

species	leaves	color	branchlets	buds	cone bracts	bark	resin ducts
homolepis	pointed and rigid	lustrous, green	grayish, glabrous, deeply grooved	—	—	scaly	internal
veitchii	"	"	not grooved, densely brown pubescent	—	—	smooth	marginal
concolor	blunt	glaucous or pale blue	pubescent, yellow-green	resinous	—	—	—
fraseri	"	lustrous, green	red, densely pubescent	small, very resinous	exserted	—	—
balsamea	"	"	ashy-gray, pubescent	"	not exerted, reflexed	—	—
cilicica	"	"	"	"	hidden	—	—
nordmanniana	"	"	"	"	exserted and reflexed	—	—

N.B. - All *ABIES* on this list are without bands of stomata on the upper side of the leaves, and have sub-globose winter buds with imbricate scales.

The Genus CEDRUS may be recognized thus
Leaves alternate or clustered on short spurs; in fascicles of 2-5 surrounded at the base by a sheath
of scarious scales; needle-leaves angled or quadrangular in section.

species	leading shoot and branchlets	cones	branchlets
deodara	pendulous	rounded at apex	pubescent, densely so
atlantica	upright or nodding	apex truncate or concave	densely short-pubescent
libani	"	"	glabrous or scarcely pubescent

The Genus CHAMAECYPARIS is recognized thus
leaves opposite or whorled, usually scale-like and minutely denticulate; cones maturing the second
year, with four or more seeds to each bract; branchlets a little flattened or angular (nearly
square); internodes about square, glandular.

species	branchlets	under side of leaves	glands	relative size of leaves	leaf tip	staminate flowers	foliage color
nootkatensis	nearly quadrangular	without white markings	usually lacking	lateral and facial equal			
pisifera	flattened	with white markings	obscure	"			
thyoides	"	"	conspicuous on back of leaves	"			
obtusa	"	"	not glandular	lateral ones larger	obtuse	yellow	lustrous dark green
lawsoniana	"	" (but sometimes indistinct)	conspicuous on back of leaves	"	acuteish	red	bright green or more or less glaucous

CRYPTOMERIA JAPONICA is recognized thus

a pyramidal tree with spreading and upcurving branches; bark red-brown, peeling in long strips much like a Cedar or a Cypress; buds minute; leaves linear-awl-shaped, flattened laterally, keeled both faces, bright green, decurrent, directed forward and curved in, in 5 ranks; flowers monoecious, staminate cones in terminal racemes, pistillate cones solitary and globose at the ends of short lateral branchlets, brown, ripening the first year, persistent; cone-scales wedge-shaped.

The Genus **CUPRESSUS** is recognized thus
foliage fragrant; bark shredding; branchlets quadrangular or terete; leaves opposite, small, scale-like, appressed; cones globular, each cone-scale with numerous seeds.

H 30

species	branches	lower bark	leaves
<i>sempervirens</i>	erect or horizontal	thin, gray, smooth or slightly longitudinally fissured	ovate, glandular
<i>macrocarpa</i>	horizontal	ridged, dark reddish-brown, separating into thick, persistent scales	rhombic-ovate, not glandular, swollen toward tip

CRYPTOMERIA — **CUPRESSUS**

The Genus JUNIPERUS is recognized thus
leaves opposite or whorled, alternating in pairs at right angles, linear or scale-like, often both
kinds on the same plant, acute, with 2 glaucous or whitish lines on the upper side and green
beneath; fruit berry-like.

species	leaves	glands	upper side of leaves	leaf base	stamineate flowers	branch lets	leaf tip	fruit	form	habit	color
communis	always needle- shaped & in 3's	absent	with one white line	Jointed	Axillary			dark blue			
macrocarpa	"	"	With two white lined	"	"			dark brown. [Glaucous]			
squamata	"	"	"	Decurrent	terminal	green	"	1-seeded,			
chinensis	of 2 kinds, opposite or in 3's	present	"	"	"	scale- like leaves obtuse	2-3 seeded	brown, bloomy			
excelsa	"	margin entire	"	"	"	acute	3-6 seeded	brown, bloomy, [or erect]			
virginiana	"	"	"	"	"	acute or acuminate	blue, upright tree	upright or spreading			
horizontalis	"	"	"	"	green	"	blue, pendu- lous	shrub	pro- strate	blue- green	
sabina	"	"	"	"	"	obtusish	"	"	ascend- ing or spread- ing, odor bad when bruised	dark green	

The Genus *LARIX* is recognized thus

tree with one main trunk through to the top, bark scaly; needle-leaves soft, deciduous, clustered on short spurs; fruit an ellipsoid cone with thinish scales.
WINTER : branches often drooping; branchlets with short lateral spurs on which are found the leaf scars; leaf scars alternate, raised, $\frac{1}{2}$ -round or triangular, minute, clustered on the short lateral spurs, with one bundle trace and no stipule scars; buds solitary, sessile, small, globose or short-ovoid, with many brown scales which are sometimes slender-pointed.

Summer and Winter Keys combined

species	bracts	under side of leaves	cones	cone scales	branchlets
<i>occidentalis</i>	exceeding scales of cone				
<i>leptolepis</i>	shorter than scales	with two white bands			
<i>europaea</i>	"	without conspicuous white bands	erect	not incurved at apex, pubescent on back	glabrous
<i>laricina</i>	"	"	pendant	glabrous, striate, lustrou	"
<i>dahurica</i>	"	"	"	"	"
syn. <i>Gmelini</i>	"	"	"	"	"

The Genus *LIBOCEDRUS* is recognized thus

Aromatic trees with the branchlets densely clothed with small, appressed, scale-like leaves; leaves $\frac{1}{4}$ -angled or terete, rarely flattened, opposite, minutely denticulate and ciliate, possibly awl-shaped and spreading on very young plants; cones globose or nearly so, ripening the 2nd season, with up to 12 woody, shield-shaped scales, each scale with numerous flattish, narrowly winged seeds.

The Genus PICEA is recognized thus
leaves scattered, needle-shaped, four-sided, and stomatiferous on all four sides; branchlets with
prominent leaf cushions separated by incised grooves and produced at the apex into a peg-like stalk
(pulvinus) to which the leaf is attached.

species	leaf form	stomata	branchlets	terminal winter-buds	cones	leaf position	leaves	bud scales
<i>jezoensis</i>	flattened	white bands above only	glabrous shining	—	scale margins minutely jagged	not pungent	—	—
<i>omorika</i>	"	"	pubescent	with awl-shaped scales at the base	with awl-shaped finely denticulate	—	—	with a distinct green midrib
<i>mariana</i>	quadrangular	lines on all four sides	pubescent, glandular	"	scales flexible, margins jagged	—	—	—
<i>orientalis</i>	"	"	pubescent	without awl-shaped scales at the base	scales stiff	lustrous dark green, very short, obtuse odor strong	lustrous dark green, very short, obtuse odor strong	—
<i>engelmanni</i>	"	"	"	"	scales flexible	—	glaucous, blue-green, $\frac{1}{4}$ "	glaucous, blue-green, $\frac{1}{4}$ "
<i>excelsa</i>	"	"	almost glabrous, not resinous pubescence minute or scattered	very long $2\frac{1}{2}$ -7" (2" or less) easily crushed	pointing forward	lustrous deep green	rounded, emarginate, tip scales revolute smelling	—
syn. — <i>abies</i>			glabrous	resinous	"	glaucous, soft; incurved; strong-smelling	spreading dark green, apex very sharp pointed	firmly appressed, dark brown
<i>canadensis</i>	"	"	—	—	—	—	dark green, apex very sharp pointed	revolute at apex, light brown
syn. <i>glauca</i>							dark green, apex very sharp pointed	—
<i>polita</i>	"	"	"	not resinous, dark brown	—	—	—	—
<i>pungens</i>	"	"	"	not resinous, light yellow-brown	"	blue-green	—	—

The Genus *PINUS* is recognized thus

needle-leaves in clusters surrounded at the base by sheaths of bud scales.

species	leaves in a cluster	sheaths	needles	branchlets	winter buds	cones	cone scales	twigs	upper bark	size of sheaths
<i>flexilis</i>	five	deciduous	slender margin entire	puberulous		dehiscent, seeds wingless				
<i>cembra</i>	"	"	margin serrulate	densely brown tomentose		seeds winged				
<i>excelsa</i> syn. <i>peuce</i>	"	"	slender 6-8", serrulate pendulous	glabrous		"		glaucous		
<i>strobus</i>	"	"	thin, soft, 2-2½", serrulate	puberulous at 1st, soon glabrous		"		not glaucous		
<i>bungeana</i>	1-4 1½-2	usual	2-5", rigid, serrulate	"		"				
<i>jeffreyi</i>	usually three	persistent	long stiff, straight, blue green	bloomy	blue-green, not resinous	deciduous				
<i>ponderosa</i>	"	"	long 5-11", stout, bright green, rounded	orange-brown, back fragrant when pressed broken	resinous, scales apical, prickly sub-terminal					orange, with odor of vanilla
<i>rigida</i>	"	"	long 3-7", stout, dark green, back flat	light brown not bloomy	scale tips tenaciously spreading					
<i>virginiana</i>	two	"		glaucous	very resinous, scales apical, prickly					
<i>banksiana</i>	"	"	stout, twisted	not glaucous	resinous, scales apical, prickly	tenaciously persistent, asymmetrical, not prickly	orange			
<i>syvvestris</i>	"	"	stout, twisted	"	"	umbonate, short stalked	dull greenish yellow	bright orange peeling		
<i>montana</i> syn. <i>mugo</i>	"	"	"	"	"	obtuse	"	dark brownish		
<i>resinosa</i>	"	"	not twisted, lustrous	"	"	deciduous, sub-sessile	light gray marked black			
<i>nigra</i>	"	"	not twisted, dull	"	"	deciduous	orange	reddish	4/5"	
							yellow-green	reddish	3/4"	

The Genus *PSEUDOTSUGA* is recognized thus
buds not resinous, pointed; needle-leaves soft and flexible, linear, flattened, spirally arranged
but spreading in two opposite rows; branches marked by oval scars where leaves have fallen; fruit
a cone.

The Genus *TAXODIUM* is recognized thus
bark furrowed and scaly; branchlets of two kinds, persistent and with axillary buds or deciduous and
without axillary buds; leaves alternate, flat, short, 2-ranked on the deciduous branchlets; fruit
a globose, short-stalked cone.

The Genus *TAXUS* is recognized thus
leaves linear, often curved and scythe-shaped, petiolate, spreading in 2 ranks, very dark green with
two broad yellowish bands on the under side; branches irregularly alternate; fruit a bony nutlet
surrounded or almost enclosed by a cup-shaped, fleshy, scarlet disk.

species	bud scales	leaves	midrib	color	foliage
<i>baccata</i>	obtuse, not keeled	gradually acuminate	—	—	—
<i>cuspidata</i>	acute, keeled	abruptly pointed	pointed above	very dark green	broad
<i>canadensis</i>	"	"	slightly raised	lighter green, turning brown	less broad, slender

The Genus *SEQUOIA* is recognized thus
a tall, evergreen tree, often exceptionally large and of very great age; bark thick, red-brown, fibrous,
deeply furrowed and ridged; leaves alternate, persistent, solitary, scattered, linear to linear-
lanceolate, with 2 white stomatic lines on the under side, petiolate; also with scale-like leaves spir-
ally arranged; branchlets all persistent; fruit a cone, woody, persistent, with divergent scales spir-
ally arranged, widened at the top and with a depressed center, wrinkled, without distinct bracts, with
6-9 flattened seeds; winter buds scaly.

PSEUDOTSUGA -- *TAXODIUM* -- *TAXUS* -- *SEQUOIA*

The Genus THUJA is recognized thus
branchlets disposed in one plane, flattened; leaves scalylike, in pairs alternate at right angles,
the lateral leaves nearly covering the facial ones; fruit a cone, ovoid-oblong or ovoid.

species	branchlets	cone scales	seeds	leaves	glands	leaf apex
orientalis	in vertical planes	thick	wingless			
occidentalis	planes not vertical	thin	winged	yellow-green beneath and with a gland		
koreana	"	"	"	with triangular present		
plicata	"	thin, fertile scales usually 6	"	white markings	absent	acute
standishii	"	thin, fertile scales usually 4	"	"	"	obtuse

The Genus TSUGA is recognized thus
branchlets with prominent leaf cushions; buds globose or ovoid, not resinous; leaves spirally arranged
but appearing 2-ranked by reason of a twist in the petiole, linear, flattened and grooved above, and
with 2 whitish bands of stomata on the under side; fruit a small cone of concave woody scales.

species	leaves	branchlets
caroliniana	margin entire	pubescent
canadensis	margin denticulate near the apex	"

GLOSSARY

- achene - a small, dry, hard, 1-celled, 1-seeded, fruit, indehiscent
- acorn - a 1-celled, 1-seeded nut, fixed in a woody cup or involucre
- acuminate - tapering at the end
- acute - terminating in a sharp or well-defined angle
- adventitious - imperfectly naturalized, as roots growing from internodes as well as nodes
- aggregate - a collection or collected mass
- alternate - (of leaves, etc.) arranged singly, at different points, not opposite
- ament - a catkin or scaly spike
- anastomosing - the ends of the veins curved to connect with the vein ahead, and by cross-veins forming a network
- annual - of one year's growth or duration
- anther - the tip of the stamen containing pollen
- apetalous - having no petals
- apiculate - ending in a short, pointed tip
- appressed - lying close and flat against
- armed - with spines or prickles
- articulate - with a joint
- articulate - having a joint or node; jointed
- ascending - rising somewhat obliquely or curving upward
- astrigent - having the power to contract or draw together organic tissues
- attenuate - slenderly tapering; becoming very narrow
- auricle - an ear-shaped appendage
- auriculate - ear-shaped
- awl-shaped - tapering upward from the base to a slender or rigid point
- awn - a bristle-shaped appendage
- axil - the angle formed by a leaf or branch with the stem
- axillary - situated in an axil
- bast - the fibrous portion of the inner bark
- beaked - ending in a prolonged tip
- bearded - bearing a long awn, or furnished with long or stiff hairs
- berry - a fruit with the seeds embedded in a fleshy pulp which represents the entire pericarp except the outer layer or skin, as the tomato, grape, and currant.
- bi or bis - a Latin prefix signifying two, twice, or doubly
- biennial - of two years duration
- bilabiate - two-lipped
- bipinnate - doubly or twice pinnate

bivalvular - with two valves
blade - the expanded portion of a leaf, etc.
bract - a more or less modified leaf subtending a flower or belonging to an inflorescence, or sometimes belonging to the stem
bractlet - a secondary bract, as one upon the pedicel of a flower
bristles - coarse, stiff hairs
bristly - having or resembling bristles
bud - the rudimentary state of a stem or branch; an unexpanded flower
budding - the act of setting a bud of one tree in contact with the cambium of another for purposes of propagation
bulb - an underground leaf bud with fleshy scales or coats
bulbous - having the character of a bulb
bundle-trace - the tiny marks upon leaf scars representing the ends of the vascular bundles which penetrated the leaf and carried water and minerals to the leaf cells.
caducous - falling off early
calcareous - composed of, containing, or of the nature of lime or limestone
callus - a hard protuberance or callosity
calyx - the outer perianth of the flower
campanulate - bell-shaped; cup-shaped with a broad base
canescent - hoary with gray pubescence
capsular - belonging to or of the nature of a capsule
capsule - a dry, dehiscent fruit composed of more than one carpel
carpel - a simple pistil or one member of a compound pistil
catkin - an ament or a deciduous scaly spike of asexual, apetalous flowers
chaff - a small, thin scale or bract, becoming dry and membranous
chambered - (of the pith) having hollows or cavities
ciliate - marginally fringed with hairs
coalescence - the union of parts or organs of the same kind
collateral - subordinately connected; secondary
compound - composed of two or more similar parts united into one whole.
compound leaf - one divided into separate leaflets
compressed - flattened, especially laterally
conduplicate - folded together lengthwise
cone - a dry, multiple fruit composed of a dense aggregation of scales arranged symmetrically around an elongated axis, and bearing seeds on the upper side
confluent - running into each other; blended into one
coniferous - cone-bearing
conglomerate - a mass or collection of material

conical - shaped like a cone
connate - united; used especially of like structures joined from the start
connivent - coming into contact; converging
convolute - rolled up longitudinally
cordate - heart-shaped with the point upward
coriaceous - leathery in texture
corm - enlarged fleshy base of a stem, bulb-like but solid
corolla - the inner perianth; composed of petals
corrugated - wrinkled or in folds
corymb - a flat-topped or convex open flower cluster; in the stricter use of the word equivalent to a contracted raceme and progressing in its flowering from the margin inward
corymbose - in corymbs or corymb-like
crenate - dentate with the teeth much rounded
crenulate - finely crenate
cucullate - hooded or hood-shaped; cowled
cuneate - wedge-shaped; triangular with the acute angle downward
cuspidate - tipped with a sharp and rigid point
cyme - a broad and flattish determinate inflorescence, i.e. with its central or terminal flowers blooming earliest
cymose - bearing cymes or cyme-like
deciduous - not persistent; not evergreen
decurrent (leaf) - extending down the stem below the insertion
dehiscent - opening regularly by valves or slits, etc. as a capsule or anther
deltoid - triangular; like an equilateral triangle
dentate - toothed, usually with the teeth directed outward
denticulate - minutely dentate
depressed somewhat flattened from above
di-, dis- - a Greek prefix signifying two or twice
diadelphous (stamens) - combined in two sets
diaphragms - dividing membranes or partitions
diffuse - widely or loosely spreading
dioecious - of two households; unisexual, with two kinds of flowers on separate plants
disc (disk) - a development of the receptacle at or around the base of the pistil
dissected cut or divided into numerous segments

distichous - in two vertical ranks
distinct - separate; not united; evident
divaricate - widely divergent
divided - lobed to the base
dorsal - on or related to the back or outer surface of an organ
drupe - a fleshy or pulpy fruit with the inner portion of the pericarp hard
or stony, one-celled and one-seeded, viz. plum
drupelet - a diminutive drupe
e- or ex- - a Latin prefix meaning without
ecology - concerning the relation of plants to their surroundings
ellipsoid - oblong with rounded ends
elliptic - of or pertaining to or shaped like an ellipse
emarginate - having a shallow notch at the extremity
endogenous - growing throughout the substance of a stem instead of by
superficial layers
entire - without toothing or division
erose - as if gnawed
exfoliating - cleaving off in thin layers
exotic - foreign; not native; appearing as if belonging to another part of the
world
exserted - projecting beyond an envelope, as stamens from a corolla
falcate - scythe-shaped; curved and flat, tapering gradually
fascicle - a close bundle or cluster
fastigiate (branches) - erect and near together; columnar
fibrous - composed of or resembling fibers
filament - the part of the stamen which supports the anther
filiform - thread-shaped
fimbriate - fringed
fissured - cracked or split
flaking - breaking off in small, flat fragments or scales
flaky - easily separable into flakes
flexible - capable of being bent
flexuous - zigzag, bending alternately in opposite directions
foliaceous - leaflike in texture or appearance
foliate - having leaves
foliolate - having leaflets
forked - divided into nearly equal branches

fluted - showing parallel grooves

fruit - the seed-bearing product of a plant

fusiform - spindle-shaped; swollen in the middle and narrowing toward each end

gibbous - protuberant or swollen on one side

glabrate - somewhat glabrous or becoming glabrous

glabrescent - inclined to be glabrous

glabrous - smooth; not rough, pubescent, or hairy

gland - a secreting surface or structure; any protuberance or appendage having the appearance of such an organ

glandular - bearing glands or of the nature of a gland

glaucous - covered or whitened with a bloom (wild yeast)

glazed - smooth and shining; glassy

globose - globe-like; nearly globular

glutinous - sticky

gnarled - distorted, knotty; twisted and cross-grained

grafting - the process of propagation by inserting a scion into a tree

habit - the general appearance of a plant

hastate - like an arrow-head

head - a dense cluster of sessile or nearly sessile flowers on a very short axis or receptacle

hispid - beset with rigid or bristly hairs or with bristles

hoary - grayish-white with a fine, close pubescence

hybrid - a cross-breed of two species

humus - decayed vegetable matter in the soil

husk - the outer covering of fruits or seeds

imbricate - overlapping, either vertically or spirally

impressed - bent inward; hollowed or furrowed as if by pressure

incised - cut sharply and irregularly, more or less deeply

indefinite - inconstant in number or very numerous

indehiscent - not opening by valves, etc; remaining persistently closed

inflated - bladdery; puffed out

inflorescence - the flowering part of a plant, and especially the mode of its arrangement

inserted - attached to or growing out of

inter- or intra- - between

internode - the portion of a stem between two nodes or growing points

introduced - brought intentionally from another region, as for purposes of cultivation

involute - a circle or collection of bracts surrounding a flower cluster or head, or a single flower

irregular - showing inequality in size, form, or union

keel - a central dorsal ridge, like the keel of a boat

keeled - having a keel or ridge

labiate - lipped

laciniate - slashed; cut into narrow, pointed lobes

lanceolate - shaped like a lance-head; several times longer than wide, broadest above the base and narrowed to the apex

lateral - pertaining to, directed from, or directed toward the side

leaflet - a single division of a compound leaf

legume - the fruit of the Leguminosae, formed of a single pistil and usually splitting open by both sutures; bean-like

leguminous - pertaining to a legume or to the Leguminosae

lenticel - breathing pore of leaf or stem

lenticular - lentil-shaped; of the shape of a double convex lens; having lenticels

limb - the expanded portion of any leaf or petal; a branch of a tree growing out from the trunk

linear - long and narrow, with parallel margins

lobe - any segment of an organ, especially if rounded

lobed - divided into or bearing lobes

median - pertaining to the middle

membrane - a thin, sheetlike structure connecting other structures or serving to cover or line some part or organ

membranous - thin, rather soft and more or less translucent tissue; pertaining to a membrane

-merous - in composition, having parts, as 2-merous, having two parts of each kind

midrib - the central or main vein of a leaf

monodelphous (stamens) - united by their filaments into a tube or column

monoecious - with stamens and pistils in separate flowers on the same plant; of one household

mucilaginous - adhesive or slimy with vegetable gum

mucronate - tipped with a short and small abrupt tip; spiny-tipped (veins).

mucronulate - with a minute spiny tip; inclined to be mucronate

multiple - containing or consisting of more than one

nerve - a simple or unbranched vein or slender rib

netted (veination) - meshed like a net

node - growing points along the stem; the place along the stem which normally bears a leaf or leaves

nut - a hard indehiscent 1-celled and 1-seeded fruit, though usually resulting from a compound ovary

nutlet - a diminutive nut

ob- - a Latin prefix, usually carrying the idea of inversion

obcordate - inverted heart-shaped

ob lanceolate - lanceolate with the broadest part near the apex

oblique - unequal sided, lop-sided, or slanting

oblong - longer than broad and with nearly parallel sides

obovate - inverted ovate

obvoid - having the form of an inverted egg

obtuse - blunt or rounded at the end

opaque - dull, neither shining nor translucent; impervious to light

opposite - arranged in pairs

orbicular - circular

ovate - egg-shaped, broadest near the base

ovoid - with an oval outline

palmate - radially lobed or divided

panicle - a loose, irregularly compound inflorescence with pedicelled flowers

panicled, paniculate - borne in a panicle; resembling a panicle

papilionaceous - (corolla) having a standard, wings, and a keel, as in a pea- or bean-blossom

papillose - bearing minute, nipple-shaped projections

pappus - the modified calyx limb in Compositae, forming a crown of very various
character at the summit of the achene
parted - cleft nearly but not quite to the base

pedicel - the support of a single flower

peduncle - a primary flower-stalk, supporting either a cluster or a solitary flower

pedunculate - borne upon a peduncle

pellucid - clear, transparent

peltate - shield-shaped and attached to the support by the lower surface

pendulous - more or less hanging or declined

perennial - lasting year after year

perfect - (flower) having both pistil and stamens

perianth - the floral envelope, consisting of calyx and corolla

persistent - long continuous, as a calyx upon the fruit, leaves through the winter, etc.

petal - a division of the corolla

petaloid - colored like and resembling a petal

petiolate - having a petiole

petiole - the stem of a leaf

pilose - hairy, especially with soft hairs

pinnate (leaf) - compound with the leaflets arranged on each side of a common petiole

pinnatifid - pinnately cleft

pistil - the seed-bearing organ of a flower, consisting of the ovary, stigma and style when present

pistillate - provided with pistils, and in its more proper sense without stamens

pitted - marked with small depressions or pits

plicate folded into plaits, usually lengthwise

plumose - having fine hairs on each side, like the barbs of a feather

pod - any dry and dehiscent fruit

pollen - the fecundating grains contained in the anther

polliniferous - bearing pollen

pome - a fleshy fruit with the seeds contained in a stiff-walled cells like the apple

porous - pierced with many small holes or pores

prickle - a small spine, or more or less slender, sharp outgrowth from the bark or rind

procumbent - lying on the ground or trailing but without rooting at the nodes

prostrate - lying flat on the ground

puberulent - minutely pubescent; inclined to be pubescent

pubescent - covered with hairs, especially if short, soft, and downlike

pulvinus (i) - an enlargement or protuberance at the base or insertion of a leaf

punctate - dotted with depressions, or with translucent internal glands or colored dots

pungent - having power to affect the nerves of sensation, as by pricking, stinging or piercing; acrid

pyriform - pear-shaped

raceme - a simple inflorescence of pedicelled flowers upon a common more or less elongated axis

racemose - in racemes or resembling racemes

rachis - the axis of a spike or of a compound leaf

radiate - spreading from or arranged around a common center

receptacle - the expanded portion of an axis bearing the organs, as pistil and stamens

recurved - curved downward or backward

reflexed - abruptly bent or turned downward

regular - uniform in shape or structure

reniform - kidney-shaped

repand - with a slightly uneven and somewhat sinuate margin

resinous - with resin

reticulate - net-veined

retuse - with a shallow notch at a rounded apex

revolute - rolled backward from the margins or apex

rhachis - see rachis

rib - a primary or prominent vein of a leaf

rotate - wheel-shaped

rufous - see rufus

rufus - reddish-brown

rugged - having a surface full of abrupt inequalities; rough; uneven

rugose - wrinkled

salver-shaped - (corolla) having a slender tube abruptly expanded into a flat limb

samara - an indehiscent winged fruit

scabrous - rough to the touch

scarious - thin, dry, and membranaceous, not green

scurfy - with exfoliated skin thrown off in minute scales

segment - one of the parts of leaf or other like organ that is cleft or divided

sepal - a division of the calyx

serrate - having sharp teeth pointing forward

serrulate - finely serrate

sessile - without footstalk of any kind

setose - beset with bristles

sheath - a tubular envelope

silky - covered with close-pressed, soft, and straight pubescence

simple - of one piece, not compound

sinuous - curving in and out

sinuate - with the outline of the margin strongly wavy

sinus - the cleft or recess between two lobes

smooth - without roughness or pubescence

spike - a form of simple inflorescence with the flowers sessile or nearly so upon a more or less elongated common axis

spine - a sharp woody or rigid outgrowth from the stem

spinescent - spine-like or having spines

spiny - with spines

spurs - stiff, sharp spines, often developing into twigs

stamen - one of the pollen-bearing organs of the flower

staminode - a sterile stamen, or any structure without anther corresponding to a stamen

standard - the upper dilated petal of a papilionaceous flower

stellate - star-shaped

stem - the main ascending axis of a plant

sterile - unproductive, as a flower without a pistil or without stamens

stigma - the sticky tip of the pistil to which the pollen clings for fertilization

stippled - an effect obtained by dots and marked as if with a twisting motion of brush or sponge

stipular - belonging to the stipules

stipulate - having stipules

stipule - an appendage at the base of a petiole or on each side of its insertion

stratified - in layers or horizontal planes

striate - marked with fine longitudinal lines or ridges

style - the usually attenuated portion of the pistil connecting the stigma and ovary

sub- - a Latin prefix, usually signifying somewhat or slightly

sub-evergreen - not quite evergreen but almost so

suborbicular - nearly circular

subulate - awl-shaped

subcordate - somewhat heart-shaped

succulent - juicy, fleshy

sulcate - grooved or furrowed

superposed - placed upon or above one another

suture - a line or dehiscence or cleavage

symmetrical - regular in form or as to the number of parts

tap-root - a single long descending root, as in the dandelion

terete - having a circular transverse section

ternate - in threes

tomentose - densely pubescent with matted wool

tomentulose - inclined to be tomentose

tomentum - the matted wool on a leaf or twig

tortuous - with irregular bends or turns

translucent - allowing some passage of light so that objects may be partly evident but not clearly visible

trifoliate - with three leaflets

truncate - ending abruptly as if cut off transversely

tuber - a thickened and short underground branch having numerous buds or eyes

tuberole - a small tuber or tuber-like body, usually subterranean

turbinate - top-shaped

umbel - an inflorescence in which the peduncles or pedicels of a cluster spring from the same point

umbellate - in or like an umbel

undulate - with a wavy surface

uni- - in composition, one

unisexual - of one sex, either staminate or pistillate only

urceolate - urn-shaped

valvate - opening by valves, as a capsule; or meeting by the edges without overlapping

valve - one of the pieces into which a capsule splits

valvular - having valves

velutinous - velvety

ventral - on or relating to the front or inner surface of an organ

verrucose - covered with wart-like projections

villous - bearing long and soft hairs

viscid - glutinous, sticky

whorl - an arrangement of leaves in a circle around the stem

whorled - with three or more leaves, buds, scars, or twigs in a circle around the stem

wing - any membranous or thin expansion bordering or surrounding an organ; the lateral petal of a papilionaceous corolla

woolly - clothed with long and tortuous or matted hairs

NOMENCLATURE

Deciduous Trees

- Acanthopanax ricinifolium* (Seem.) - Castor Aralia. syn. *Kalopanax pictus*
Acer campestre (Linn.) - Hedge or Field Maple
Acer dasycarpum (Ehrh.) - Silver or Soft Maple. syn. *Acer saccharinum*
Acer japonicum (Thunb.) - Japanese or Full-Moon Maple
Acer negundo (Linn.) - Box Elder
Acer nigrum (Michx.) - Black Maple
Acer palmatum (Thunb.) - Japanese Maple, Palmate-leaved Maple
Acer pennsylvanicum (Linn.) - Moosewood, Striped or Goosefoot Maple
Acer platanoides (Linn.) - Norway Maple
Acer pseudoplatanus (Linn.) - Sycamore Maple
Acer rubrum (Linn.) Red Maple, Scarlet Maple
Acer saccharinum (Linn.) - Silver Maple . syn. *Acer dasycarpum*
Acer saccharum (Marsh.) - Sugar Maple, Hard Maple
Acer spicatum (Lam.) - Mountain Maple
Aesculus glabra (Willd.) - Ohio Buckeye
Aesculus hippocastanum (Linn.) - Horsechestnut
Ailanthus altissima (Mill.) - Stinking Chun, Tree of Heaven. syn. *A.glandulosa*
Ailanthus glandulosa (Desf.) - Tree of Heaven, Ash-can Tree. syn. *A.altissima*
Alnus glutinosa (Gaertn.) - Black or European Alder
Alnus incana (Willd.) - Speckled or Hoary-leaved Alder
Amelanchier canadensis (Med.) - Juneberry, Downy Shadblow
Amelanchier laevis (Wieg.) - Shadblow, Allegheny Serviceberry
Asimina triloba (Dunal.) Papaw
Betula alba (Linn.) - White Birch. syn. *Betula pendula*
Betula lenta (Linn.) - Cherry Birch, Sweet Birch
Betula lutea (Michx.) - Yellow Birch
Betula nigra (Linn.) - Red or River Birch
Betula papyrifera (Marsh.) - Paper or Canoe Birch
Betula pendula (Roth.) - White Birch. syn. *B.alba*
Betula populifolia (Ait.) - Gray Birch, Poplar Birch
Carya cordiformis (Wangh.) - Bitternut Hickory. syn. *Hicoria cordiformis*
Carya glabra (Mill.) - Pignut Hickory. syn. *Hicoria glabra*
Carya laciniosa (Michx.) - Kingnut or Big Shellbark Hickory. syn. *Hicoria laciniosa*
Carya ovata (Mill.) - Shagbark Hickory. syn. *Hicoria ovata*
Carya pecan (Marsh.) - Pecan. syn. *Hicoria pecan*
Carya tomentosa (Lam.) - Mockernut or White Hickory. syn. *Hicoria alba*
Carpinus caroliniana (Walt.) - Blue Beech, Ironwood.
Castanea dentata (Borkh.) - Chestnut
Castanea mollissima (Blume.) - Chinese Chestnut
Catalpa bignonioides (Walt.) - Southern Catalpa
Catalpa kaempferi (Sieb.& Zucc.) - Japanese Catalpa. syn. *Catalpa ovata*
Catalpa speciosa (Engelm.) - Western Catalpa
Catalpa ovata (Don.) - Japanese Catalpa syn. *Catalpa Kaempferi*
Cedrela sinensis (Juss.) - Chinese Cedrela
Celtis occidentalis (Linn.) - Hackberry
Cercidiphyllum japonicum (Sieb.& Zucc.) - Katsura tree, Cercis-leaf
Cercis canadensis (Linn.) - Redbud or Judas tree
Cladrastis lutea (Koch.) - Yellow-wood, Virgilia
Cornus alternifolia (Linn.) - Alternate-leaved or Pagoda Dogwood
Cornus florida (Linn.) - Flowering Dogwood
Cornus mas (Linn.) - Cornelian Cherry
Crataegus coccinea (Linn.) - Red Haw, Scarlet Thorn. syn. *Crataegus intricata*
Crataegus cordata (Ait.) - Washington Thorn. syn. *Crataegus phaenopyrum*
Crataegus crus-galli (Linn.) - Cockspur Thorn
Crataegus monogyna (Jacq.) - English Hawthorn
Crataegus oxyacantha (Linn.) - English Hawthorn White Thorn, Quickset.
Crataegus phaenopyrum (L.f.) - Washington Thorn. syn. *Crataegus cordata*
Crataegus punctata (Jacq.) - Dotted Hawthorn
Diospyros virginiana (Linn.) - Persimmon
Elaeagnus angustifolia -(Linn.) - Russian Olive, Oleaster
Fagus americana (Sweet.) - Beech, Silver Beech. syn. *Fagus grandifolia*
Fagus grandifolia (Ehrh.) - Silver Beech. syn. *Fagus americana*
Fagus sylvatica (Linn.) - European Beech

Fraxinus americana (Linn.) - White Ash
Fraxinus excelsior (Linn.) - European Ash
Fraxinus lanceolata (Borkh.) - Green Ash. syn. *Fraxinus pennsylvanica* Lanceolata
Fraxinus nigra (Marsh.) - Black Ash or Hoop Ash
Fraxinus pennsylvanica (Marsh.) - Red Ash
Fraxinus quadrangulata (Michx.) - Blue Ash
Ginkgo biloba (Linn.) - Ginkgo, Maidenhair Tree
Gleditsia triacanthos (Linn.) - Honey Locust
Gymnocladus dioica (Koch) - Kentucky Coffee Tree. syn. *G. dioicus* (Linn.)
Halesia tetrapetala (Linn.) - Silverbell, Snowdrop tree. syn. *Halesia tetrapetala*
Halesia tetrapetala (Ellis.) - Silverbell, Snowdrop tree. syn. *H. carolina*
Hicoria alba (Brit.) - Mockernut or White Hickory. syn. *Carya tomentosa*
Hicoria cordiformis (Brit.) - Bitternut Hickory. syn. *Carya cordiformis*
Hicoria glabra (Brit.) - Pignut Hickory. syn. *Carya glabra*
Hicoria laciniosa (Sarg.) - Kingnut or Big Shellbark Hickory. syn. *Carya laciniosa*
Hicoria ovata (Brit.) - Shagbark Hickory. syn. *Carya ovata*
Hicoria pecan (Brit.) - Pecan. syn. *Carya pecan*
Juglans cinerea (Linn.) - Butternut, White Walnut
Juglans nigra (Linn.) - Black Walnut
Juglans regia (Linn.) - English or Persian Walnut
Juglans sieboldiana (Maxim.) - Japanese Walnut, Kurume
Koelreuteria paniculata (Laxm.) - Japanese Varnish Tree
Kalopanax pictus (Thunb.) - Castor Aralia. syn. *Acanthopanax ricinifolium*
Laburnum anagyroides (Med.) - Golden Rain tree. syn. *Laburnum vulgare*
Laburnum vulgare (Griseb.) - Golden Chain tree. syn. *Laburnum anagyroides*
Liquidambar styraciflua (Linn.) - Sweet Gum
Liriodendron tulipifera (Linn.) - Tulip tree, Whitewood
Maclura pomifera (Schneid.) - Osage Orange, Hedge Apple
Magnolia acuminata (Linn.) - Cucumber Tree
Magnolia glauca (Linn.) - Sweet Bay. syn. *Magnolia virginiana*
Magnolia soulangeana (Soul.) - Saucer Magnolia
Magnolia tripetala (Linn.) - Umbrella Magnolia
Magnolia virginiana (Linn.) - Sweet Bay. syn. *Magnolia glauca*
Malus angustifolia (Michx.) - Southern Crab
Malus arnoldiana (Sarg.) - Arnold Crab
Malus baccata (Borkh.) - Siberian Crab
Malus coronaria (Mill.) Garland Crab
Malus floribunda (Sieb.) Japanese Flowering Crab
Malus halliana (Koeh.) Hall's Crab
Malus ioensis (Brit.) - Prairie Crab
Malus sargentii (Rehd.) - Sargent Crab
Malus schiedeckeri (Zab.) - Schiedeckeri Crab
Malus spectabilis (Borkh.) Chinese Flowering Crab
Morus alba (Linn.) - White Mulberry, Chinese Mulberry
Morus rubra (Linn.) - Red Mulberry
Nyssa sylvatica (Marsh.) - Tupelo, Pepperidge, Sour Gum
Ostrya virginiana (Koch.) - Hop Hornbeam, Ironwood
Paulownia imperialis (Seib. & Zucc.) - Royal Paulownia. syn. *Paulownia tomentosa*
Paulownia tomentosa (Thunb.) Royal Paulownia. syn. *P. imperialis*
Phellodendron amurense (Rupr.) - Amoor Cork Tree
Phellodendron sachalinense (Sarg.) - Saghulin Cork Tree
Platanus acerifolia (Willd.) - London Plane Tree
Platanus occidentalis (Linn.) - Sycamore, Buttonwood
Platanus orientalis (Linn.) - Platan, European Plane Tree
Populus alba (Linn.) - White Poplar, Abele
Populus deltoides (Marsh.) - Carolina Poplar, Cottonwood
Populus grandidentata (Michx.) - Coarse-toothed Poplar
Populus nigra (Linn.) - Black Poplar
Populus simoni (Carr.) - Simon Poplar
Populus tremuloides (Michx.) - Quaking Aspen
Prunus avium (Linn.) - Sweet Cherry
Prunus cerasifera (Ehrh.) - Cherry Plum
Prunus cerasus (Linn.) - Dwarf or Pie Cherry
Prunus padus (Linn.) - Bird Cherry
Prunus pennsylvanica (Linn.) - Pin Cherry, Bird Cherry
Prunus persica (Sieb. & Zucc.) - Peach
Prunus serotina (Ehrh.) - Wild Black Cherry
Prunus subhirtella (Miq.) - Rosebud or Japanese Cherry
Prunus virginiana (Linn.) - Choke Cherry

Pyrus communis (Linn.) - Common Pear
Quercus alba (Linn.) - White Oak
Quercus bicolor (Willd.) - Swamp White Oak
Quercus coccinea (Muench.) - Scarlet Oak
Quercus imbricaria (Michx.) - Shingle Oak
Quercus macrocarpa (Michx.) - Bur Oak, Mossy-cup Oak
Quercus Marilandica (Muench.) - Black Jack or Jack Oak
Quercus palustris (Linn.) - Pin Oak
Quercus phellos (Linn.) - Willow Oak
Quercus prinus (Linn.) - Basket Oak. syn *Quercus michauxii*
Quercus robur (Linn.) - English Oak
Quercus rubra (DuRoi.) - Red Oak. syn. *Quercus borealis maxima*
Quercus velutina (Lam.) - Black Oak
Robinia pseudoacacia (Linn.) - Black Locust
Salix alba (Linn.) - White or Huntingdon Willow
Salix babylonica (Linn.) - Weeping Willow, Napoleon Willow
Salix caprea (Linn.) - Goat Willow
Salix vitellina (Linn.) Golden Willow. syn. *Salix alba vitellina*
Sassafras albidum (Nutt.) - Sassafras. syn. *Sassafras variifolium*
Sassafras variifolium (Kuntze.) - Sassafras. syn. *Sassafras albidum*
Sophora japonica (Linn.) - Chinese Scholartree
Sorbus americana (Marsh.) - Mountain Ash
Sorbus aucuparia (Linn.) - European Mountain Ash, Roan tree
Syringa japonica (Decne.) - Japanese Tree Lilac. syn. *Syringa amurensis* (Rupr.)
Tilia americana (Linn.) - Basswood, Whitewood
Tilia cordata (Mill.) - Littleleaf Linden
Tilia europaea (Linn.) - Common Linden, Lime tree. syn. *Tilia vulgaris*
Tilia heterophylla (Vent.) - Beetree Linden
Tilia petiolaris (Hook.f. not D.C.) - Weeping White Linden
Tilia tomentosa (Moench.) - Silver Linden
Tilia vulgaris (Hayne.) - Common Linden, Lime tree. syn. *Tilia europaea*
Ulmus americana (Linn.) - American or White Elm
Ulmus campestris (Mill.) - English Elm. syn. *Ulmus procera*
Ulmus fulva (Michx.) - Red or Slippery Elm
Ulmus glabra (Huds.) - Scotch or Wych Elm
Ulmus procera (Salisb.) - English Elm. syn. *Ulmus campestris*
Ulmus pumila (Linn.) - Chinese or Siberian Elm
Ulmus thomasi (Sarg.) - Rock Elm. syn. *Ulmus racemosa*
Ulmus racemosa (Thomas, not Borkh.) - Rock Elm. syn. *Ulmus thomasi*
Zelkova serrata (Mak.) - Sawleaf Zelkova

DECIDUOUS SHRUBS

Acanthopanax pentaphyllum (March.) - Five-fingered Aralia. syn. *A. sieboldiana*
Acanthopanax sieboldianus (Mak.) - 5-fingered Aralia. syn. *A. pentaphyllum*
Acer ginnala (Maxim.) - Amur Maple
Acer tataricum (Linn.) - Tatarian Maple
Aesculus pavia (Linn.) - Damask Horsechestnut
Aesculus parviflora (Walt.) - Bottlebrush Buckeye
Alnus rugosa (Spreng.) - Smooth Alder, Hazel Alder
Alnus viridis (D.C.) - European Green Alder
Amelanchier alnifolia (Nutt.) - Saskatoon. Syn. *Amelanchier canadensis* var.
Amelanchier ovalis (Med.) European Shadblow. syn. *Amelanchier rotundifolia*
Amelanchier rotundifolia (Dum.-Cours.) - European Shadblow. syn. *A. ovalis*
Amorpha canescens (Nutt.) - Lead Plant
Amorpha fruticosa (Linn.) - False Indigo, Indigobush
Aralia spinosa (Linn.) - Hercules Club, Angelica Tree
Aronia arbutifolia (Spach.) - Red Chokeberry
Aronia melanocarpa (Spach.) - Black Chokeberry
Azalea amoena (Lindl.) - Amoena Azalea. syn. *Azalea obtusum*
Azalea arborescens (Pursh.) - Sweet or Smooth Azalea. syn. *Rhododendron arborescens*
Azalea mollis (molle) (Blume.) - Chinese Azalea
Azalea nudiflora (nudiflorum) (Linn.) - Pinxterbloom
Azalea obtusum (Lindl.) - Amoena Azalea. syn. *Azalea amoena*

Azalea obtusum (Lindl.) - Sweet or Smooth Azalea. syn. *Azalea amoena*
Azalea roseum (Rehd.) - Downy Pinxterbloom
Azalea vaseyi (Rehd.) - Pinkshell Azalea. syn. *Rhododendron vaseyi* (Gray)
Azalea viscosa (viscosum) (Linn.) - Swamp Azalea or Swamp Honeysuckle
Baccharis halimifolia (Linn.) - Groundsel Bush, Saltbush
Benzoin aestivale (Nees.) - Spicebush, Spicewood. syn. *Lindera benzoin*
Berberis buxifolia (Poir.) - Box Barberry
Berberis darwini (Hook.) - Darwin Barberry
Berberis thunbergi (D.C.) - Thunberg's or Japanese Barberry
Berberis wilsoni (Hemsl.) - Wilson Barberry
Berberis vulgaris (Linn.) - Common Barberry
Betula nana (Linn.) - Dwarf Birch
Betula pumila (Linn.) - Hairy Dwarf Birch
Buddleia davidi (Franch.) - Butterfly Bush. syn. *Buddleia variabilis*
Buddleia variabilis (Hemsl.) - Butterfly bush. syn. *Buddleia davidi*
Calycanthus floridus (Linn.) - Carolina Allspice, Strawberry Bush
Caragana arborescens (Lam.) Pea Shrub, Pea Tree
Castanea pumila (Mill.) - Chinquapin
Catalpa bungei (C.A.Mey.) - Manchurian Catalpa
Ceanothus americanus (Linn.) - New Jersey Tea, Redroot
Cephalanthus occidentalis (Linn.) - Buttonbush, Honeyballs
Chaenomeles lagenaria (Loisel.) - Japanese Quince. syn. *Cydonia japonica*
Chionanthus virginica (virginicus) (Linn.) - White Fringe, Fringe-tree
Clethra alnifolia (Linn.) - Sweet Pepperbush, Summersweet
Colutea arborescens (Linn.) - Bladder Senna
Comptonia asplenifolia (Gaertn.) - Sweet Fern. syn. *Comptonia peregrina*
Comptonia peregrina (Coul.) - Sweet Fern. syn. *Comptonia asplenifolia*, *Myrica*
Cornus alba (Linn.) - Red or Tartarian Dogwood
Cornus amomum (Mill.) - Silky Cornel, Kinnikinnick
Cornus baileyi (Coult.&Evans) - Bailey Dogwood
Cornus paniculata (L'Her) - Gray or Paniced Dogwood. syn. *Cornus racemosa*
Cornus racemosa (Lam.) - Gray Dogwood. syn. *Cornus paniculata*
Cornus sanguinea (Linn.) - Bloodtwig Dogwood
Cornus stolonifera (Michx.) - Red-twigg Dogwood, Red-osier Dogwood
Corylus americana (Walt.) - American Hazel-nut
Corylus avellana (Linn.) - Filbert, European Hazel
Corylus cornuta (March.) - Cuckold Hazel. syn. *Corylus rostrata*
Corylus rostrata (Ait.) - Beaked Hazel. syn. *Corylus cornuta*
Cotinus coggygria (Scop.) - Smoketree. syn. *Rhus cotinus*
Cotoneaster acutifolia (Turcz.) - Peking Cotoneaster
Cotoneaster adpressa (Bois.) - Creeping Cotoneaster
Cotoneaster divaricata (Rehd. & Wilson) - Spreading Cotoneaster
Cotoneaster horizontalis (Decne.) - Rock Cotoneaster, Quinceberry
Cotoneaster hupehensis (Rehd. & Wilson) - Hupeh Cotoneaster
Cotoneaster racemiflora (Koch.) - Coin-leaf Cotoneaster
Cydonia japonica (Pers.) - Japanese Quince. syn. *Chaenomeles lagenaria*
Cytisus scoparius (Link.) - Scotch Broom
Daphne mezereum (Linn.) - Mezereon or Flowering Spurge
Deutzia gracilis (Sieb.& Zucc.) Slender Deutzia
Deutzia lemoinei (Hort.) Lemoine Deutzia
Deutzia scabra (Thunb.) - Fuzzy Deutzia
Dirca palustris (Linn.) - Leatherwood, Wicopy
Elaeagnus argentea (Pursh.) - Silverberry, Wolf Willow. syn. *E. commutata*
Elaeagnus commutata (Bernh.) - Silverberry. syn. *Elaeagnus argentea*
Elaeagnus longipes (Gray) - Cherry Elaeagnus, Gumi. syn. *E. multiflora*
Elaeagnus multiflora (Thunb.) - Cherry Elaeagnus. syn. *E. longipes*
Elaeagnus umbellata (Thunb.) - Autumn Elaeagnus
Euonymus alata (alatus)(maxim.) - Winged Burning Bush
Euonymus americanus (Linn.) - Brook Euonymus
Euonymus atropurpureus (Jacq.) - Wahoo, Skewerwood. syn. *E. atropurpurea* (Jacq.)
Euonymus europeus (Linn.) - Spindle Tree
Euonymus yedoensis (Koehne.) - Yeddo Euonymus
Exochorda grandiflora (Lindl.) - Pearlbrush. syn. *Exochorda racemosa*
Exochorda racemosa (Lindl.) - Pearlbrush. syn. *Exochorda grandiflora*
Forsythia intermedia (Zabel.) - Golden Bell
Forsythia suspensa (Vahl.) - Golden Bell
Forsythia viridissima (Lindl.) - Golden Bell

Genista tinctoria (Linn.) - Dyer's Greenwood, Woodwaxen
Hamamelis japonica (Sieb.&Zucc) - Japanese Witch-hazel
Hamamelis virginiana (Linn.) - Witch-hazel
Hibiscus syriacus (Linn.) - Althaea, Rose of Sharon
Hippophae rhamnoides (Linn.) - Sea Buckthorn
Hydrangea arborescens (Linn.) - Smooth Hydrangea
Hydrangea paniculata (Sieb.) - Paniced or Plumed Hydrangea
Hydrangea quercifolia (Bartram.) - Oak-leaved Hydrangea
Hypericum calycinum (Linn.) - Aaronsbeard
Hypericum densiflorum (Pursh.) - Bushy St.John's Wort
Ilex verticillata (Linn.) - Northern Holly, Black Alder, Winterberry
Kerria japonica (Wm.Kerr) - Kerria, Globe-flower, Corkchorus
Kolkwitzia amabilis (Graebn.) - Beautybush
Ligustrum amurense (Carr.) - Amur Privet
Ligustrum ibolium (Coe.) - Ibolium Privet
Ligustrum ibota (Sieb.) - Ibota Privet
Ligustrum ovalifolium (Hassk.) - California Privet
Ligustrum quihoui (Carr.) - Quihou Privet
Ligustrum vulgare (Linn.) - Common Privet, or Prim
Lindera benzoin (L.) Bl. - Spicebush. syn. Benzoin aestivale
Lonicera bella (Zabel.) - Belle Honeysuckle
Lonicera chrysanthia (Turcz.) - Coralline Honeysuckle
Lonicera fragrantissima (Lindl.) - Fragrant or Winter Honeysuckle
Lonicera korolkowi (Stapf.) - Blue-leaf Honeysuckle
Lonicera maackii (Maxim.) - Amur Honeysuckle
Lonicera morrowii (Gray) - Morrow Honeysuckle
Lonicera standishi (Carr.) - Standish Honeysuckle
Lonicera tatarica (Linn.) - Tatarian Honeysuckle
Lonicera xylosteum (Linn.) - Fly Honeysuckle
Lycium chinense (Mill.) - Chinese Box Thorn or Matrimony Vine
Lycium halimifolium (Mill.) - Common Matrimony Vine
Magnolia stellata (Maxim.) - Star Magnolia
Myrica carolinensis (Mill.) - Northern Bayberry or Candleberry
syn. *Myrica pennsylvanicum*
Myrica gale (Linn.) - Sweet Gale or Bog Myrtle
Myrica pennsylvanica (Lois.) - Candleberry. syn *Myrica carolinensis*
Nemopanthus mucronatus (Trel.) - Mountain Holly
Philadelphus coronarius (Linn.) - Mock Orange, Sweet Syringa
Philadelphus falconeri (Sarg.) - Star Mock-orange
Philadelphus gordonianus (Lindl.) - Gordon Mock-orange
Philadelphus lemoinei (Lemoine) - Lemoine Mock-orange
Philadelphus zeyheri (Schrad.) - Zeyher Mockorange
Photinia villosa (DC.) - Chinese Christmas-berry or Photinia
Physocarpus opulifolius (Maxim.) - Ninebark

Prunus glandulosa (Thunb.) - Dwarf Flowering Almond.
Prunus tomentosa (Thunb.) - Nanking or Nankeen Cherry
Prunus triloba (Lindl.) - Flowering Almond, Flowering Plum
Ptelea trifoliata (Linn.) - Wafer Ash
Quercus prinoides (Willd.) - Chinquapin, Chincapin Oak
Rhamnus caroliniana (Walt.) - Carolina Buckthorn or Indian Cherry
Rhamnus cathartica (Linn.) - Buckthorn
Rhamnus frangula (Linn.) - Glossy Buckthorn
Rhamnus purshiana (DC.) - Cascara sagrada
Rhododendron arborescens (Pursh.) Sweet Azalea. syn. *Azalea obtusum*
Rhododendron vaseyi (Gray) - Pinkshell Azalea. syn. *Azalea vaseyi*
Rhodotypos kerrioides (Sieb.& Zucc.) - Jetbead, White Kerria. syn. *R. scandens*
Rhodotypos scandens (Thunb.) - Jetbead. syn. *Rhodotypos kerricoides*
Rhus aromatica (Ait.) - Fragrant Sumac. syn. *Rhus canadensis*
Rhus canadensis (Marsh.) - Fragrant Sumach. syn. *Rhus aromatica*
Rhus copallina (Linn.) - Shining or Mountain Sumac
Rhus cotinus (Linn.) - Smoketree or Wig Tree. syn. *Cotinus coggygria*
Rhus glabra (Linn.) - Smooth Sumac
Rhus javanica (Thunb.) - Java Sumac. syn. *Rhus chinensis* (Mill.)
Rhus typhina (Linn.) - Staghorn Sumach

Ribes alpinum (Linn.) - Alpine or Mountain Currant
Ribes aureum (Pursh.) - Golden Flowering Currant
Ribes odoratum (Wendl.) - Missouri or Buffalo Currant
Ribes sanguineum (Pursh.) - Red-flowered or Winter Currant
Robinia hispida (Linn.) - Rose Acacia, Bristly Locust
Robinia viscosa (Vent.) - Clammy Locust
Rosa carolina (Linn.) - Pasture Rose. syn. *Rosa humilis*
Rosa eglanteria (Linn.) - Sweet Briar, Eglantine. syn. *Rosa rubiginosa*
Rosa hugonis (Hemsl.) - Father Hugo's Rose
Rosa humilis (Marsh.) - Pasture Rose. syn. *Rosa carolina*
Rosa multiflora (Thunb.) - Japanese or Many-flowered Rose
Rosa nitida (Willd.) - Bristly or Glossy-leaved Rose
Rosa rubiginosa (Linn.) - Sweet Briar or Eglantine. syn. *Rosa eglanteria*
Rosa rugosa (Thunb.) - Rugose Rose
Rosa setigera (Michx.) - Prairie Rose
Rosa wichuraiana (Crep.) - Memorial Rose
Rosa zanthina (Lindl.) - Korean Rose or Double Hugonis
Rubus allegheniensis (Porter.) - American Blackberry
Rubus flagellaris (Willd.) - Dewberry. syn. *Rubus procumbens*
Rubus idaeus (Linn.) - European or Common Raspberry
Rubus occidentalis (Linn.) - Black Raspberry or Blackcap
Rubus odoratus (Linn.) - Flowering Raspberry
Rubus procumbens (Muhl.) - Cultivated American Dewberry. syn. *Rubus flagellari*
Rubus strigosus (Michx.) - Common Red Raspberry. syn. *Rubus idaeus strigosus*
Salix candida (Flugge) - Rosemary Willow. syn. *Salix incana*
Salix discolor (Muhl.) - Pussy Willow
Salix humilis (Marsh.) - Prairie Willow
Salix incana (Schrank.) - Rosemary Willow. syn. *Salix candida*
Salix irrorata (Anders.) - Colorado Willow
Salix lucida (muhl.) - Shining Willow
Salix pentandra (Linn.) - Laurel or Bayleaf Willow
Salix tristis (Ait.) - Dwarf or Sage Willow
Sambucus canadensis (Linn.) - Sweet Elder
Sambucus nigra (Linn.) - European Elder
Sambucus racemosa (Linn.) - Red-berried Elder
Shepherdia canadensis (Nutt.) - Buffaloberry
Sorbaria sorbifolia (A.Braun.) - Ash-leaved Spirea
Spirea arguta (Zabel.) - Garland Spirea
Spirea bumalda (Burvenich.) - Bumalda Spirea
Spirea prunifolia (Sieb. & Zucc.) - Bridal Wreath, Plumleaf Spirea
Spirea thunbergii (Sieb.) - Thunberg's Spirea
Spirea tomentosa (Linn.) - Hardhack or Steeplebush
Spirea vanhouttei (Zab.) - VanHoutte Spirea
Staphylea trifolia (Linn.) - American Bladdernut
Stephenandra flexuosa (Sieb. & Zucc.) - Cut-leaf Stephenandra. syn. *S. incisa*
Stephenandra incisa (Thunb.) - Cut-leaf Stephenandra. syn. *S. flexuosa*
Symphoricarpus albus (Blake.) - Snowberry. syn. *Symphoricarpus racemosus*
Symphoricarpus orbiculatus (Moench.) - Indian Currant. syn. *S. vulgaris*
Symphoricarpus racemosus (Michx.) - Snowberry. syn. *Symphoricarpus albus*
Symphoricarpus vulgaris (Michx.) - Buckbrush. syn. *Symphoricarpus orbiculatus*

Syringa amurensis (Rupr.) - Amur or Manchurian Lilac
Syringa chinensis (Willd.) - Rouen Lilac
Syringa josikaea (Jacq.) - Hungarian Lilac
Syringa pekinensis (Rupr.) - Peking Lilac
Syringa persica (Linn.) - Persian Lilac
Syringa sweginzowi (Koeh. & Lingelsh.) - Chengtu Lilac
Syringa villosa (Vahl.) - Himalayan Lilac
Syringa vulgaris (Linn.) - Common Lilac
Tamarix gallica (Linn.) - French Tamarisk
Tamarix parviflora (DC.) - Tamarisk
Tamarix pentandra (Pall.) - Five-stamen Tamarisk
Vaccinium angustifolium (Ait.) - Lowbush Blueberry. syn. *Vaccinium Pennsylvanicu*
Vaccinium corymbosum (Linn.) - Highbush Huckleberry, Tall Blueberry
Vaccinium pensylvanicum (Lam.) - Lowbush Blueberry. syn. *V. angustifolium*
Viburnum acerifolium (Linn.) - Dockmackie or Maple-leaved Viburnum
Viburnum americanum (Mill.) - Crampbark or American Highbush Cranberry

Viburnum burkwoodi (Burkwood) - Gardenia-scented Snowball
Viburnum carlesii (Hemsl.) - Fragrant Viburnum
Viburnum cassinoides (Linn.) - Withe-rod
Viburnum dentatum (Linn.) - Arrow-wood
Viburnum lantana (Linn.) - Wayfaring Tree
Viburnum lentago (Linn.) - Nannyberry, Sheepberry
Viburnum nudum (Linn.) - Possumhaw or Smooth Withe-rod
Viburnum opulus (Linn.) - European Highbush Cranberry
Viburnum prunifolium (Linn.) - Blackhaw or Stagbush
Viburnum sieboldii (Miq.) - Siebold Viburnum
Viburnum tomentosum (Thunb.) - Doublefile Viburnum
Weigela amabilis (Hort.) - Rose Weigela. syn. *Weigela florida*, *Diervilla florida*
Weigela floribunda (Sieb. & Zucc.) - Crimson Weigela
Weigela florida (Sieb. & Zucc.) - Rose Weigela. syn. *Weigela amabilis*
Xanthoceras sorbifolia (*sorbifolium*) (Bunge) - Chinese Buckeye or Flowering Chestnut. syn. *Xanthoceras simplicissima* (Marsh.)
Xanthorrhiza aprifolia (L'Her.) Yellowroot
Zanthoxylum americanum (Mill.) - Prickly Ash

VINES

Actinidia arguta (Miq.) - Silver Vine
Akebia quinata (Decne.) - Five-fingered Akebia
Ampelopsis aconitifolia (Bunge) Monkshood Vine
Ampelopsis brevipedunculata (Maxim.) - Porcelain Berry. syn. *A. heterophylla*
Ampelopsis heterophylla (Sieb. & Zucc.) - Turquoise Berry. syn. *A. brevipedunculata*
Ampelopsis quinquefolia (Michx.) - Woodbine, Virginia Creeper
syn. *Parthenocissus quinquefolia*
Ampelopsis tricuspidata (Sieb. & Zucc.) - Boston Ivy. syn. *Parthenocissus tricuspidata*
Aristolochia durior (Hill) - Dutchman's Pipe. syn. *Aristolochia siphonifera*
Aristolochia siphonifera (L'Her.) - Dutchman's Pipe. syn. *Aristolochia durior*
Bignonia grandiflora (Linn.) - Chinese Trumpet Creeper. syn. *Campsipendula grandiflora*
Bignonia radicans (Seem.) - Trumpet Vine. syn. *Campsipendula radicans*
Campsipendula grandiflora (Thunb.) - Chinese Trumpet Creeper. syn. *Bignonia grandiflora*
Campsipendula radicans (Linn.) - Trumpet Vine. syn. *Bignonia radicans*
Celastrus orbiculatus (*orbiculata*) (Thunb.) - Oriental Bittersweet
Celastrus scandens (Linn.) - Bittersweet
Clematis henryi (Anderson-Henry) - Henry Clematis
Clematis jackmani (Th. More) - Jackman Clematis
Clematis paniculata (Thunb.) - Japanese Clematis
Clematis virginiana (Linn.) - Virgin's Bower
Coccinia carolinus (DC.) - Carolina Moonseed
Decumaria barbara (Linn.) - Decumaria
Hydrangea petiolaris (Sieb. & Zucc.) - Climbing Hydrangea
Lonicera japonica (Thunb.) - Japanese Honeysuckle
Lonicera sempervirens (Linn.) - Trumpet Honeysuckle
Menispermum canadense (Linn.) - Moonseed
Parthenocissus quinquefolia (L.) Planch. - Woodbine. syn. *Ampelopsis quinquefolia*
Parthenocissus tricuspidata (Sieb. & Zucc.) - Boston Ivy. syn. *Ampelopsis tricuspidata*
Periploca graeca (Linn.) - Silk Vine
Polygonum auberti (Henry) - Silver-lace Vine
Polygonum baldschuanicum (Regel.) - Silver Lace Vine
Pueraria thunbergiana (Benth.) - Kudzu Bean
Schizophragma hydrangeoides (Sieb. & Zucc.) - Japanese Hydrangea Vine
Smilax glauca (Walter) - Cat-briar or Saw-briar
Smilax hispida (Muhl.) - Green Briar
Smilax rotundifolia (Linn.) - Horse Briar
Solanum dulcamara (Linn.) - Deadly Nightshade
Vitis aestivalis (Michx.) - Summer Grape
Vitis coignetiae (Palliat.) - Gloryvine
Vitis labrusca (Linn.) - Fox Grape
Vitis vulpina (Linn.) - Riverbank or Frost Grape
Wisteria floribunda (DC.) - Japanese Wisteria
Wisteria sinensis (Sweet) - Chinese Wisteria

BROAD-LEAVED EVERGREENS

Andromeda polifolia (Linn.) - Wild or Bog Rosemary
Arctostaphylos uva-ursi (Spreng.) - Bearberry, Kinnikinnick
Berberis neuberti (Lem.) - Neubert Barberry. syn. *Mahoberberis neuberti*
Berberis mentorensis (Wayside) - Mentor Barberry
Buxus sempervirens (Linn.) - Boxwood
Calluna vulgaris (Hull) - Heather, Ling
Chamaedaphne calyculata (Moench.) - Leatherleaf, Cassandra
Chimaphila umbellata (Nutt.) - Pipsissewa, Prince's Pine
Daphne cneorum (Linn.) - Garland Flower
Epigaea repens (Linn.) - Trailing Arbutus, Mayflower
Erica carnea (Linn.) - Moor Heath
Erica cinerea (Linn.) - Scotch Heath
Erica tetralix (Linn.) - Cross-leaved Heath
Erica vagans (Linn.) - Cornish Heath
Euonymus fortunei (Turcz.) - Wintercreeper. syn. *Euonymus radicans*
Euonymus japonica (Linn.) - Evergreen Burning Bush
Euonymus radicans (Sieb.) - Wintercreeper. syn. *E. fortunei*
Gaultheria procumbens (Linn.) - Checkerberry, Wintergreen
Hedera helix (Linn.) - English Ivy
Ilex aquifolium (Linn.) - European or English Holly
Ilex crenata (Thunb.) - Japanese Holly
Ilex glabra (Gray) - Inkberry
Ilex opaca (Ait.) - American or Christmas Holly
Kalmia angustifolia (Linn.) - Sheep-Laurel, Lambkill
Kalmia latifolia (Linn.) - Mt. Laurel, Calico Bush
Kalmia polifolia (Wangh.) - Pale Laurel
Ledum groenlandicum (Oed.) - Labrador Tea
Leucothoe catesbaei (Gray) - Drooping Leucothoe
Lyonia mariana (Linn.) - Staggerbush. syn. *Pieris mariana*
Mahoberberis neuberti (Baumann) - Neubert Barberry. syn. *Berberis neuberti*
Mahonia aquifolium (Nutt.) - Oregon Grape
Pachistima canbyi (Gray) - Ratstripper
Pachysandra terminalis (Sieb. & Zucc.) - Mt. Spurge
Pieris floribunda (Benth. & Hook.) - Fetterbush
Pieris japonica (D. Don) - Japanese Andromeda
Pieris mariana (Benth. & Hook.) - Staggerbush. syn. *Lyonia mariana*
Pyracantha coccinea (Roem.) - Scarlet Firethorn
Rhododendron catawbiense (Michx.) - Rose Bay, Catawba Rhododendron
Rhododendron maximum (Linn.) - Great Laurel, American Rose Bay
Viburnum rhytidophyllum (Hemsl.) - Leatherleaf Viburnum
Vinca minor (Linn.) - Myrtle, Lesser Periwinkle

CONIFERS

Abies balsamea (Mill.) - Balsam Fir, Balm of Gilead
Abies cilicica (Carr.) - Cilician Fir
Abies concolor (Lindl. & Gord.) - White or Silver Fir
Abies Fraseri (Poir.) - Fraser Fir or She Balsam
Abies homolepis (Sieb. & Zucc.) - Nikko Fir. syn. *Abies brachyphylla*
Abies nordmanniana (Spach.) - Nordman or Caucasian Fir
Abies veitchii (Lindl.) - Veitch Fir
Cedrus atlantica (Manetti) - Atlas or Algerian Cedar
Cedrus deodara (Laws.) - Deodar Cedar
Cedrus libani (Laws.) - Cedar of Lebanon
Chamaecyparis lawsoniana (Parl.) - Lawson's Cypress. syn. *Cupressus lawsoniana*
Chamaecyparis nootkatensis (Sudw.) - Nootka Cypress
Chamaecyparis obtusa (Endl.) - Hinoki Cypress
Chamaecyparis pisifera (Endl.) - Sawara Cypress, Retinospora
Chamaecyparis thyoides (Brit.) - White Cedar
Cryptomeria japonica (D. Don.) - Cryptomeria
Cupressus lawsoniana (A. Murr.) - Lawson Cypress. syn. *Chamaecyparis lawsoniana*
Cupressus macrocarpa (Hartw.) - Monterey Cypress

Cupressus sempervirens (Linn.) - Italian Cypress
Juniperus chinensis (Linn.) - Chinese Juniper
Juniperus communis (Linn.) - Common Juniper
Juniperus excelsa (Bieb.) - Greek Juniper
Juniperus horizontalis (Moench.) - Creeping Juniper
Juniperus japonica (Hort.) - Prostrate Juniper. syn. *J.chinensis japonica* (Carr.)
Juniperus sabina (Linn.) - Savin Juniper
Juniperus squamata (Buch.-Ham.) - Creeping Cedar
Juniperus virginiana (Linn.) - Red Cedar
Larix europaea (DC.) - Larch. syn. *Larix decidua* (Mill.)
Larix laricina (K.Koch) - Tamarack, Hackmatack
Picea canadensis (BSP) - White or Canadian Spruce . syn. *P.glauca* (Moench.)
Picea engelmanni (Engelm.) - Engelmann Spruce
Picea excelsa (Link.) - Norway Spruce. syn. *Picea abies* (L.)
Picea mariana (BSP.) - Black Spruce
Picea omorika (Bolle) - Servian Spruce
Picea orientalis (Carr.) - Oriental Spruce
Picea polita (Carr.) - Tigertail Spruce
Picea pungens (Engelm.) - Colorado Spruce
Pinus banksiana (Lamb.) - Jack Pine or Scrub Pine
Pinus bungeana (Zucc.) - Lace-bark Pine
Pinus cembra (Linn.) - Swiss Stone Pine
Pinus flexilis (James) - Limber Pine
Pinus montana (Mill.) - Swiss Mountain Pine
Pinus mugo (Turra.) - Mugho Pine . syn. *Pinus montana mugho*
Pinus nigra (Arnold) - Austrian Pine
Pinus ponderosa (Dougl.) - Western Yellow Pine, Bull Pine
Pinus resinosa (Ait.) - Red Pine, Norway Pine
Pinus rigida (Mill.) - Pitch Pine
Pinus strobus (Linn.) - White or Weymouth Pine
Pinus sylvestris (Linn.) - Scotch Pine
Pinus virginiana (Mill.) - Scrub or Jersey Pine
Pseudotsuga douglasii (Carr.) - Douglas Fir . syn. *P.taxifolia*
Pseudotsuga taxifolia (Poir.) - Douglas Fir . syn. *Pseudotsuga douglasii*
Sciadopitys verticillata (Sieb. & Zucc.) - Umbrella Pine
Taxodium distichum (Rich.) - Bald Cypress
Taxus baccata (Linn.) - English Yew
Taxus canadensis (Marsh.) - American Yew
Taxus cuspidata (Sieb. & Zucc.) - Japanese Yew
Thuja koraiensis (Nakai) Korean Arborvitae
Thuja occidentalis (Linn.) - Arborvitae or White Cedar
Thuja orientalis (Linn.) - Oriental Arborvitae . syn. *Biota*
Thuja plicata (Don.) - Giant Arborvitae
Tsuga canadensis (Carr.) - Hemlock
Tsuga caroliniana (Engelm.) - Carolina Hemlock

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